Judul :

Does innovation efficiency affect financial performance? The role of ownership concentration

Jurnal : Investment Management and Financial Innovations

Reputasi : **Terindeks Scopus Q2**

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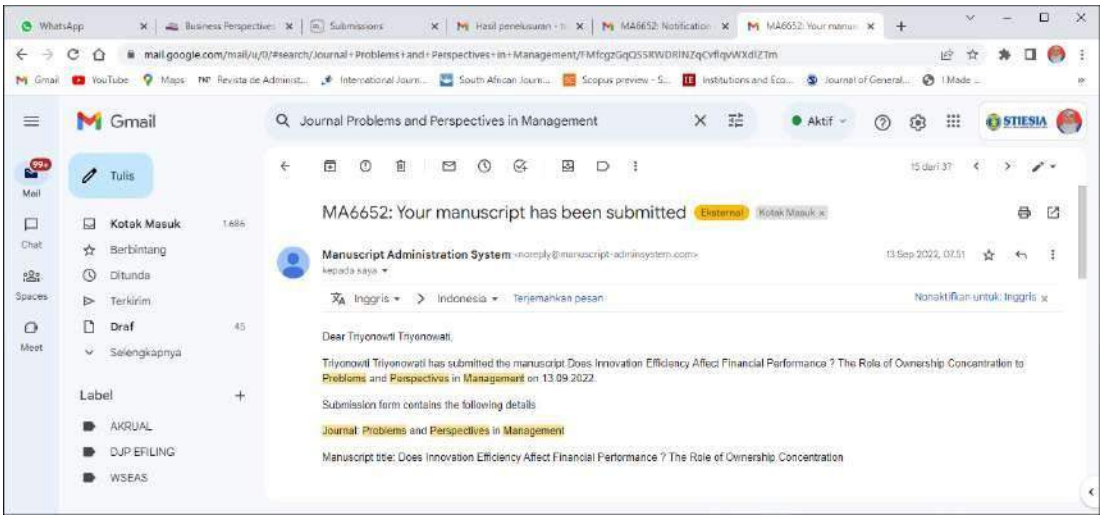
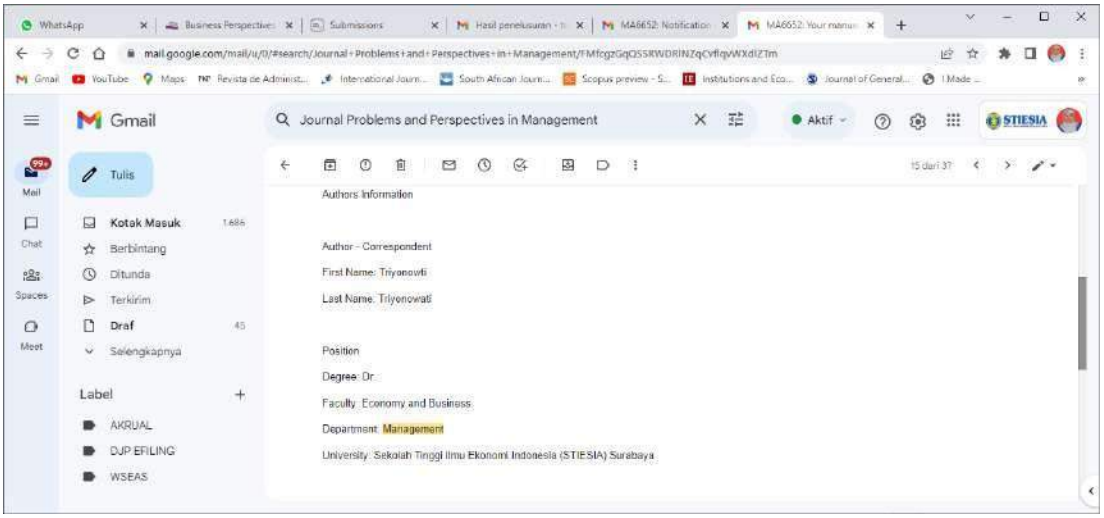
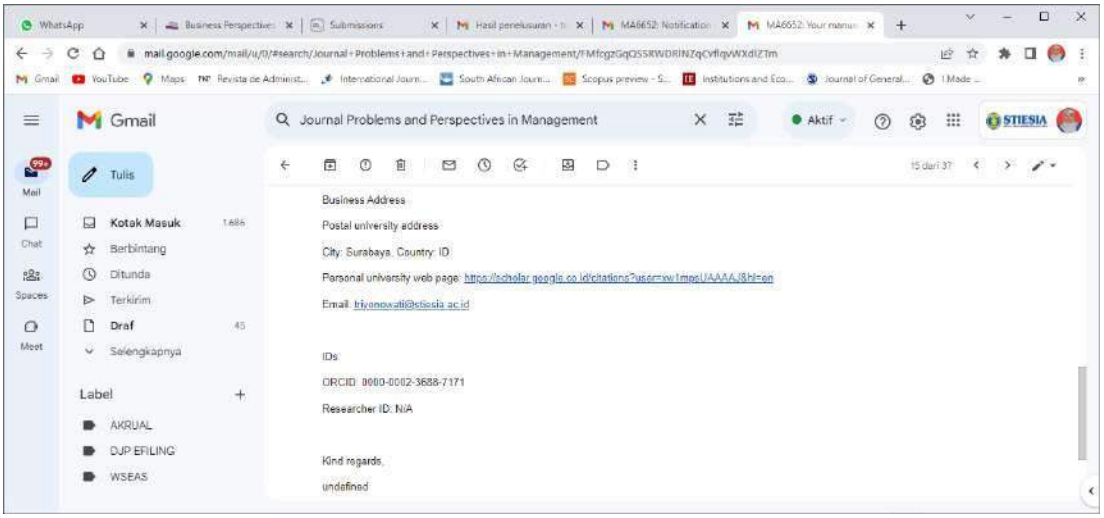
SubmissionLetter - 1







Keterangan: Bukti pada item 1.1 berupa bukti submit (Hal 2-4)

Dear Triyonowti Triyonowati,

Triyonowti Triyonowati has submitted the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration
to Problems and Perspectives in Management on 13.09.2022.

Submission form contains the following details:

Journal: Problems and Perspectives in Management

Manuscript title: Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration

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Author - Correspondent

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Last Name: Triyonowati

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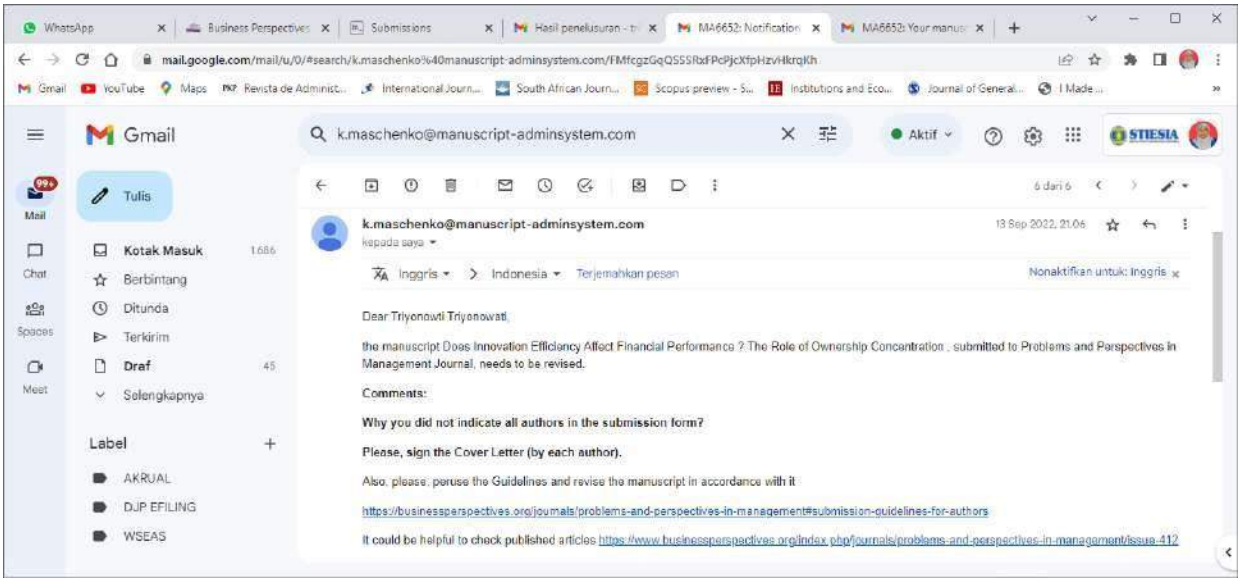
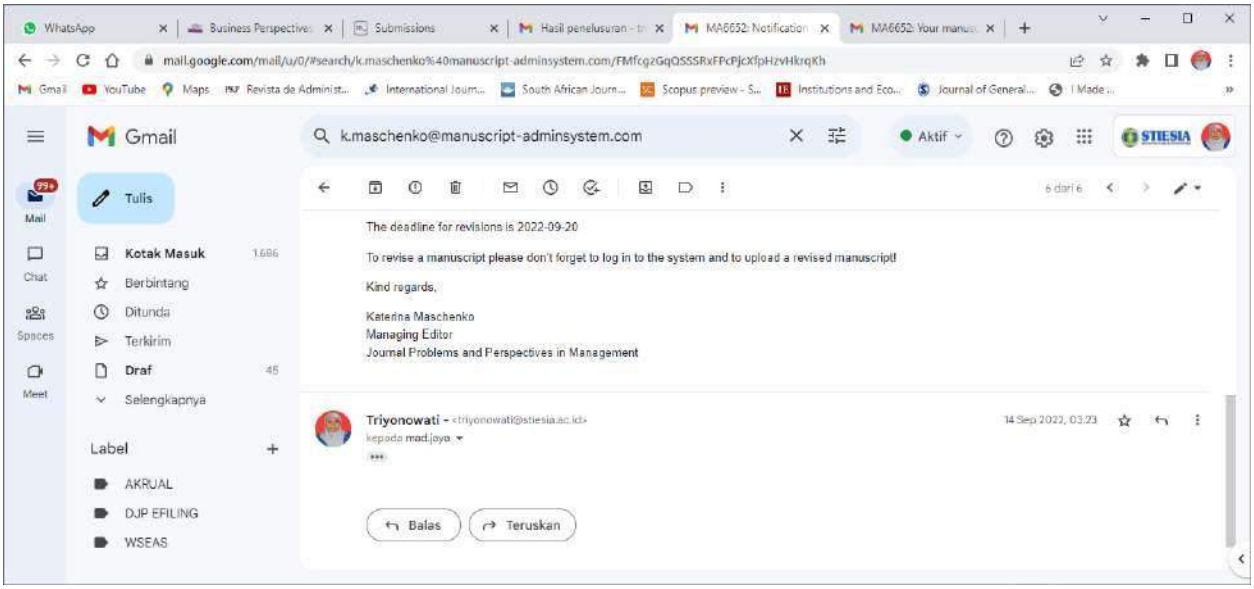
Researcher ID: N/A

Kind regards,

undefined

Revision Submission Paper - 1





Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted to Problems and Perspectives in Management Journal, needs to be revised.

Comments:

Why you did not indicate all authors in the submission form?

Please, sign the Cover Letter (by each author).

Keterangan: Bukti pada item 1.2 (5-6)

Also, please, peruse the Guidelines and revise the manuscript in accordance with it

https://businessperspectives.org/journals/problems-and-perspectives-in-management#submission-guidelines-for-authors

It could be helpful to check published articles https://www.businessperspectives.org/index.php/journals/problems-and-perspectives-in-management/issue-412

The deadline for revisions is 2022-09-20

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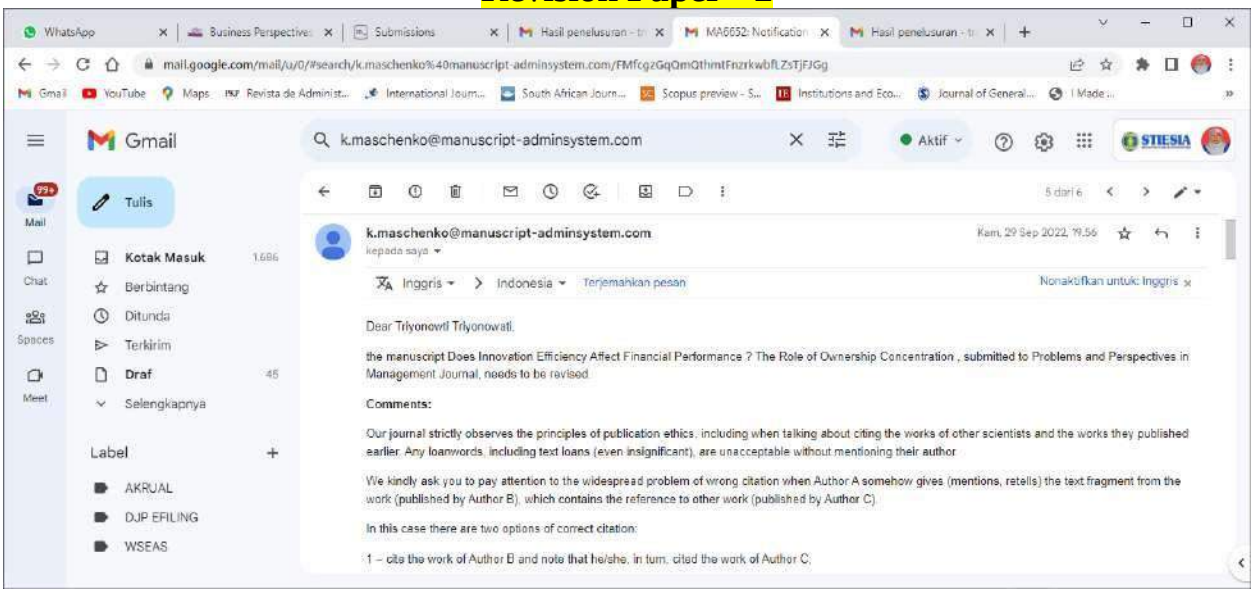
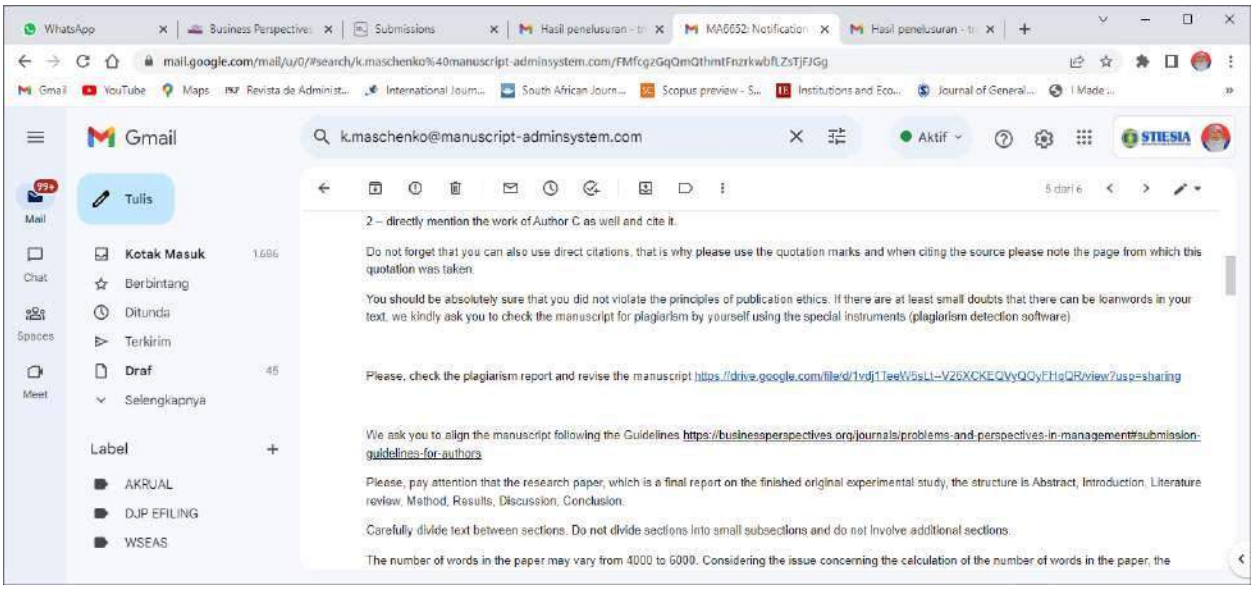
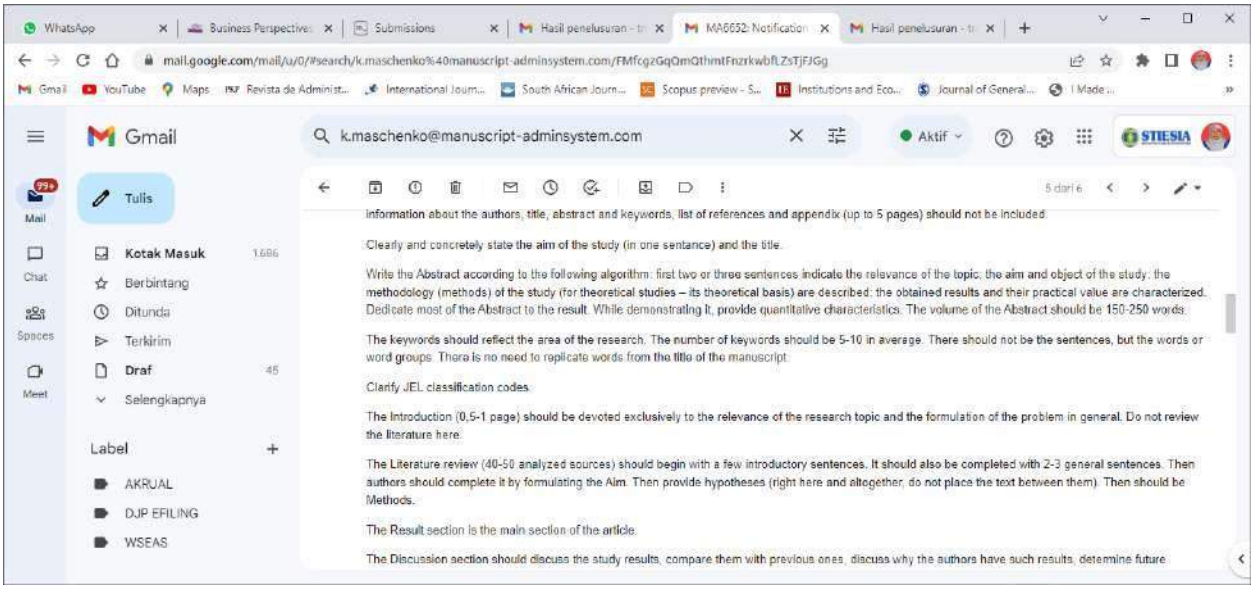
Managing Editor
Journal Problems and Perspectives in Management

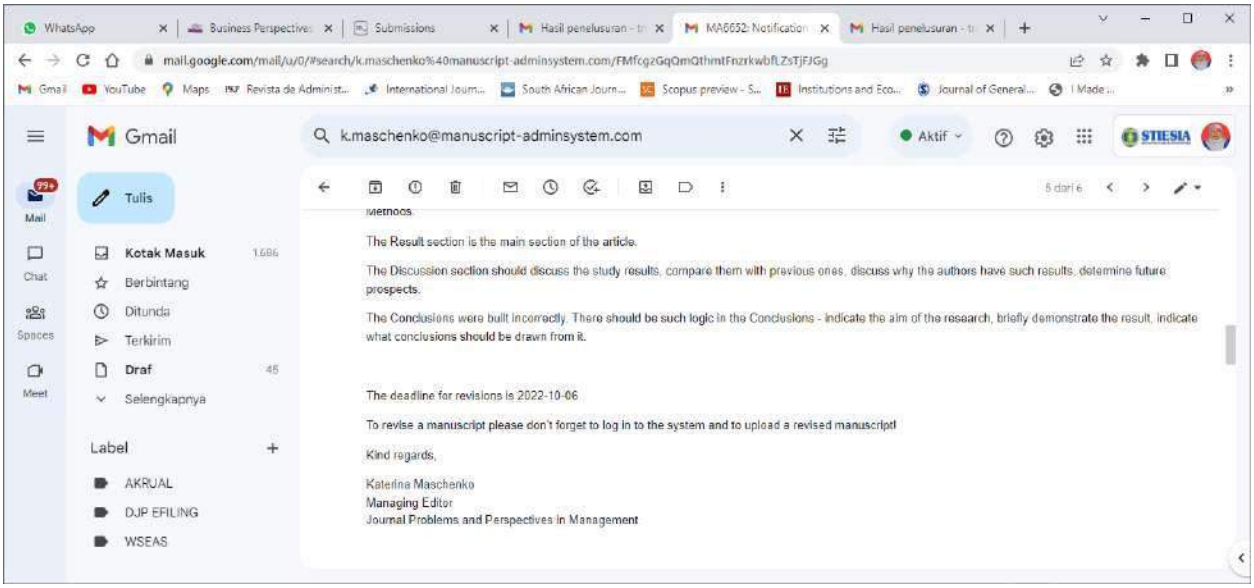
Revision Paper - 2





Keterangan: Bukti pada item 1.3. (Hal 7-10)





Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted to Problems and Perspectives in Management Journal, needs to be revised.

Comments:

Our journal strictly observes the principles of publication ethics, including when talking about citing the works of other scientists and the works they published earlier. Any loanwords, including text loans (even insignificant), are unacceptable without mentioning their author.

We kindly ask you to pay attention to the widespread problem of wrong citation when Author A somehow gives (mentions, retells) the text fragment from the work (published by Author B), which contains the reference to other work (published by Author C).

In this case there are two options of correct citation:

1 – cite the work of Author B and note that he/she, in turn, cited the work of Author C;

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We ask you to align the manuscript following the Guidelines https://businessperspectives.org/journals/problems-and-perspectives-in-management#submission-guidelines-for-authors

Please, pay attention that the research paper, which is a final report on the finished original experimental study, the structure is Abstract, Introduction, Literature review, Method, Results, Discussion, Conclusion.

Carefully divide text between sections. Do not divide sections into small subsections and do not involve additional sections.

The number of words in the paper may vary from 4000 to 6000. Considering the issue concerning the calculation of the number of words in the paper, the information about the authors, title, abstract and keywords, list of references and appendix (up to 5 pages) should not be included.

Clearly and concretely state the aim of the study (in one sentance) and the title.

Write the Abstract according to the following algorithm: first two or three sentences indicate the relevance of the topic; the aim and object of the study; the methodology (methods) of the study (for theoretical studies – its theoretical basis) are described; the obtained results and their practical value are characterized. Dedicate most of the Abstract to the result. While demonstrating it, provide quantitative characteristics. The volume of the Abstract should be 150-250 words.

The keywords should reflect the area of the research. The number of keywords should be 5-10 in average. There should not be the sentences, but the words or word groups. There is no need to replicate words from the title of the manuscript.

Clarify JEL classification codes.

The Introduction (0,5-1 page) should be devoted exclusively to the relevance of the research topic and the formulation of the problem in general. Do not review the literature here.

The Literature review (40-50 analyzed sources) should begin with a few introductory sentences. It should also be completed with 2-3 general sentences. Then authors should complete it by formulating the Aim. Then provide hypotheses (right here and altogether, do not place the text between them). Then should be Methods.

The Result section is the main section of the article.

The Discussion section should discuss the study results, compare them with previous ones, discuss why the authors have such results, determine future prospects.

The Conclusions were built incorrectly. There should be such logic in the Conclusions - indicate the aim of the research, briefly demonstrate the result, indicate what conclusions should be drawn from it.

The deadline for revisions is 2022-10-06

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Kind regards,

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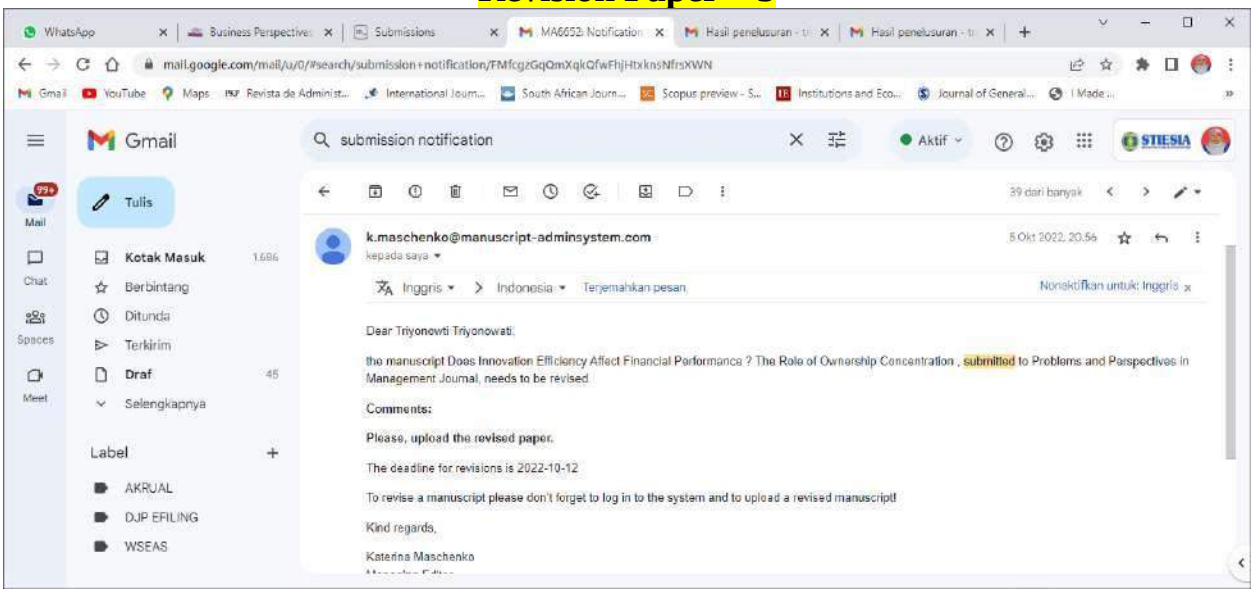
Journal Problems and Perspectives in Management

Revision Paper – 3



Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted to Problems and Perspectives in Management Journal, needs to be revised.

Comments:

Please, upload the revised paper.

The deadline for revisions is 2022-10-12

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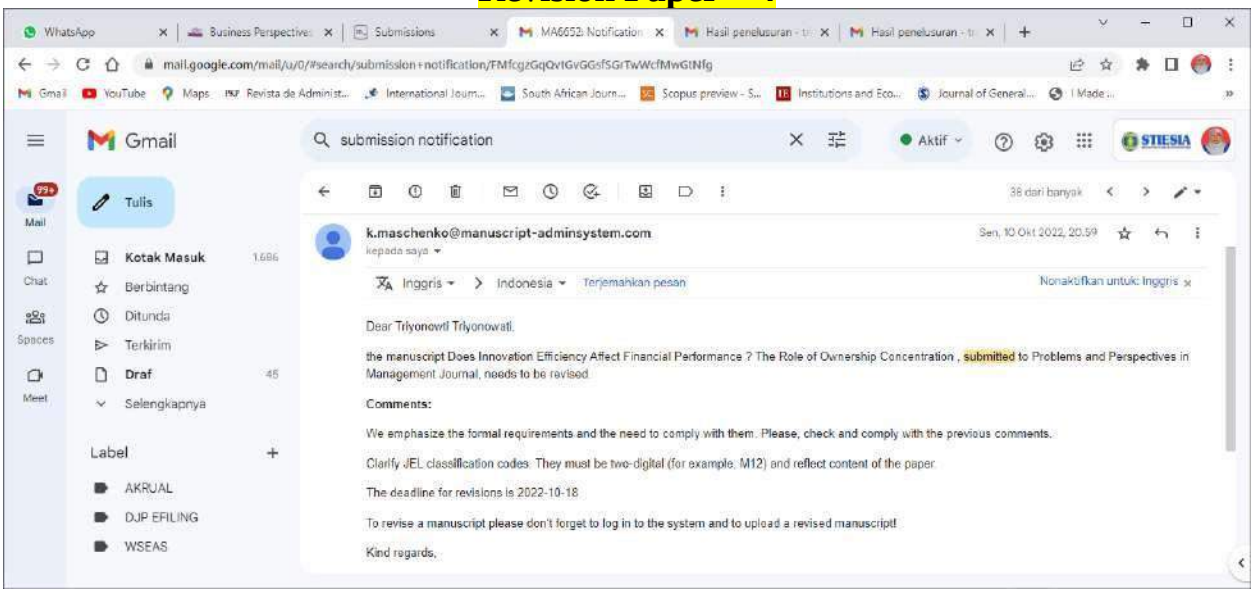
Journal Problems and Perspectives in Management

Keterangan: Bukti pada item 1.4.(Hal 11)

Revision Paper – 4



Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted to Problems and Perspectives in Management Journal, needs to be revised.

Comments:

We emphasize the formal requirements and the need to comply with them. Please, check and comply with the previous comments.

Clarify JEL classification codes. They must be two-digital (for example, M12) and reflect content of the paper.

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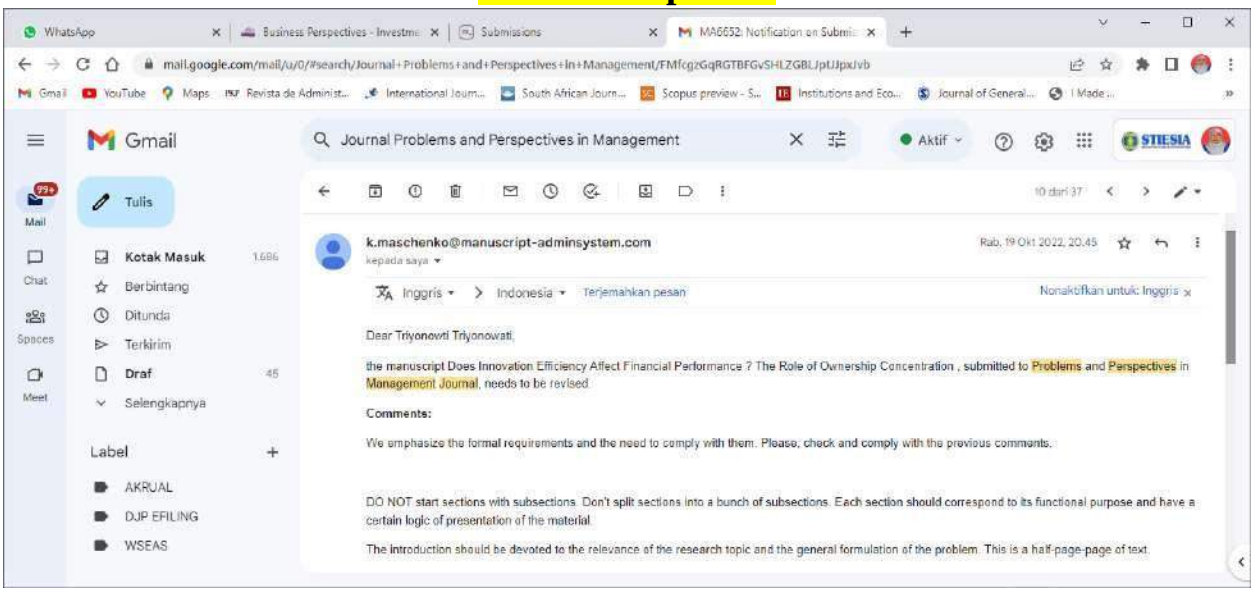
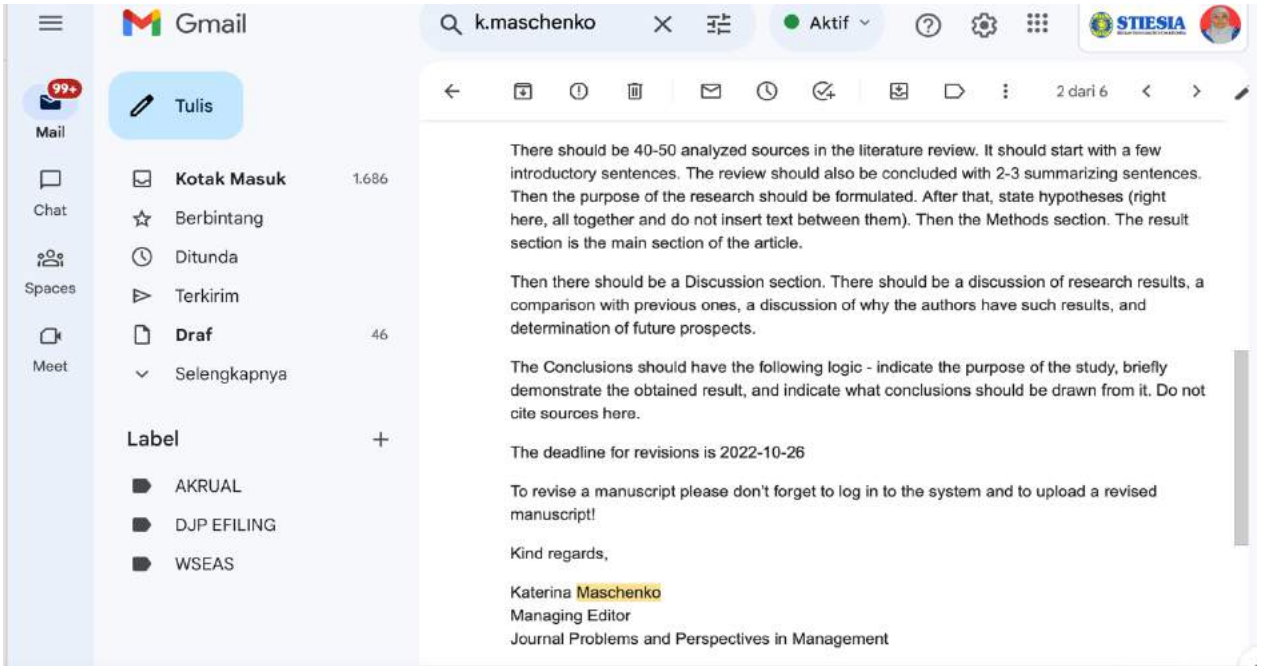
Keterangan: Bukti pada item 1.5 (Hal 12)

Revision Paper – 5





Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted
to Problems and Perspectives in Management Journal, needs to be revised.
Comments:
We emphasize the formal requirements and the need to comply with them. Please, check and comply with the previous comments.

Keterangan: Bukti pada item 1.6 (Hal 13-14)

DO NOT start sections with subsections. Don't split sections into a bunch of subsections. Each section should correspond to its functional purpose and have a certain logic of presentation of the material.

The introduction should be devoted to the relevance of the research topic and the general formulation of the problem. This is a half-page-page of text.

There should be 40-50 analyzed sources in the literature review. It should start with a few introductory sentences. The review should also be concluded with 2-3 summarizing sentences. Then the purpose of the research should be formulated. After that, state hypotheses (right here, all together and do not insert text between them). Then the Methods section. The result section is the main section of the article.

Then there should be a Discussion section. There should be a discussion of research results, a comparison with previous ones, a discussion of why the authors have such results, and determination of future prospects.

The Conclusions should have the following logic - indicate the purpose of the study, briefly demonstrate the obtained result, and indicate what conclusions should be drawn from it. Do not cite sources here.

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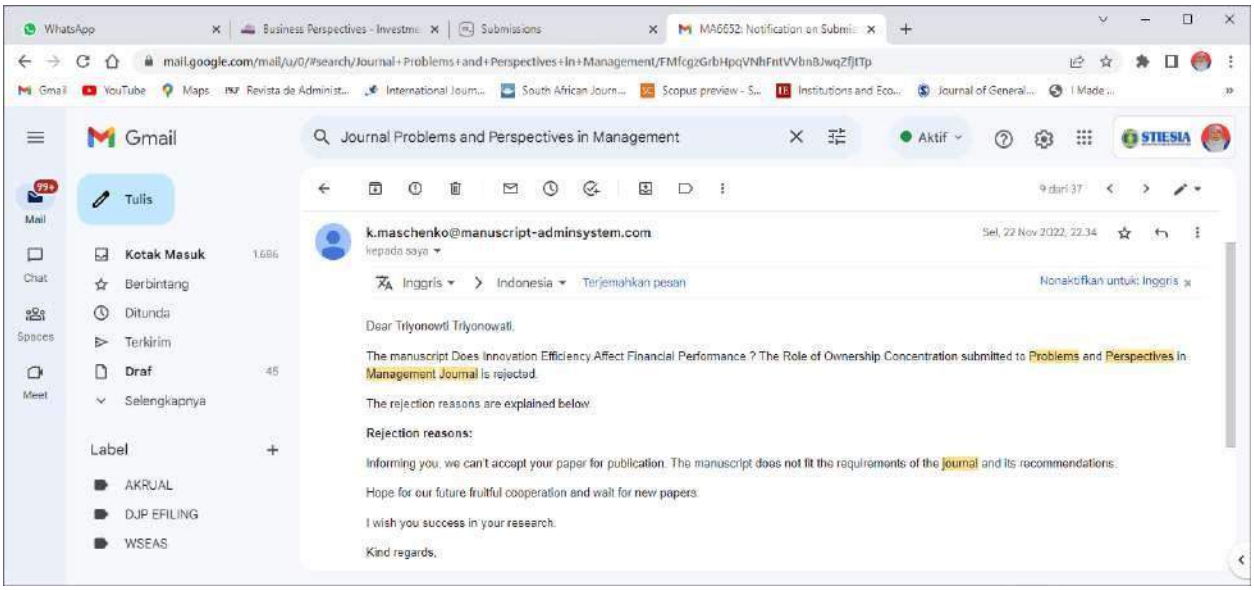
Journal Problems and Perspectives in Management

Decisions Paper (Rejected) - 1



Dear Triyonowti Triyonowati,

The manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration submitted
to Problems and Perspectives in Management Journal is rejected.

The rejection reasons are explained below.

Rejection reasons:

Informing you, we can't accept your paper for publication. The manuscript does not fit the requirements of the journal and its recommendations.

Hope for our future fruitful cooperation and wait for new papers.

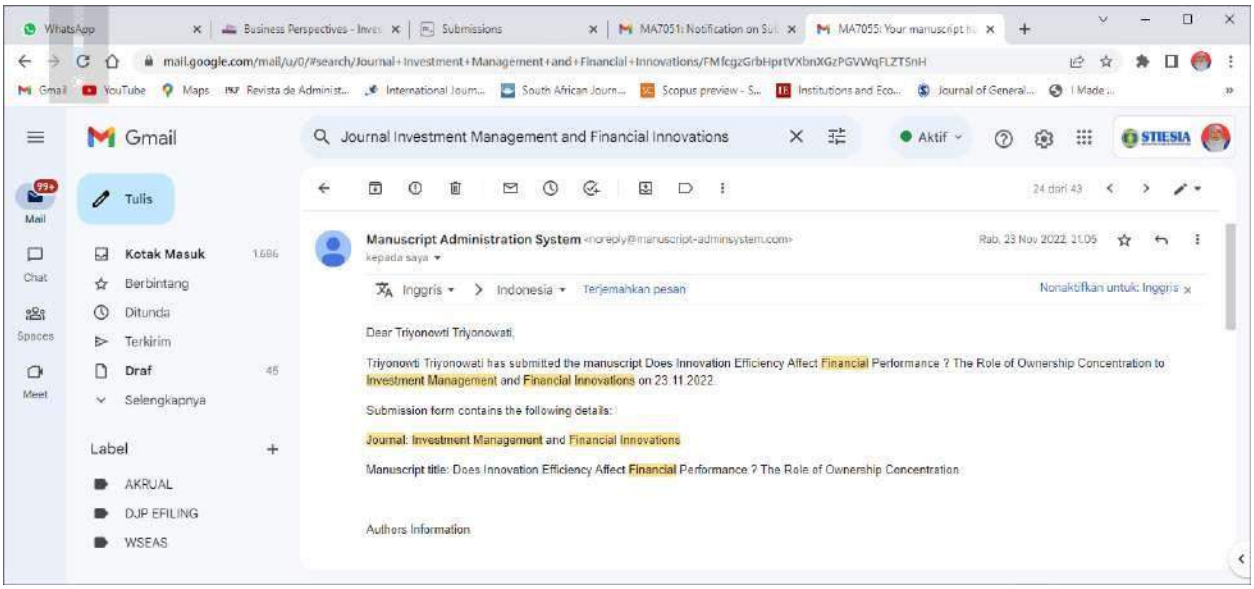
I wish you success in your research.

Kind regards,

Katerina Maschenko
Managing Editor
Journal Problems and Perspectives in Management

Keterangan:Bukti pada item 1.7 (Hal 15)

SubmissionLetter - 2



Dear Triyonowti Triyonowati,

Triyonowti Triyonowati has submitted the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration to Investment Management and Financial Innovations on 23.11.2022.

Submission form contains the following details:

Journal: Investment Management and Financial Innovations

Manuscript title: Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration

Authors Information

Author - Correspondent

First Name: Triyonowti

Last Name: Triyonowati

Keterangan: Bukti item 2.1 (Hal 16-17)

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Degree: Dr.

Faculty: Economy and Business

Department: Management

University: Sekolah Tinggi Ilmu Ekonomi Indonesia (STIESIA) Surabaya

Business Address

Postal university address

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Personal university web page: https://scholar.google.co.id/citations?user=xw1mpsUAAAAJ&hl=en

Email: triyonowati@stiesia.ac.id

IDs

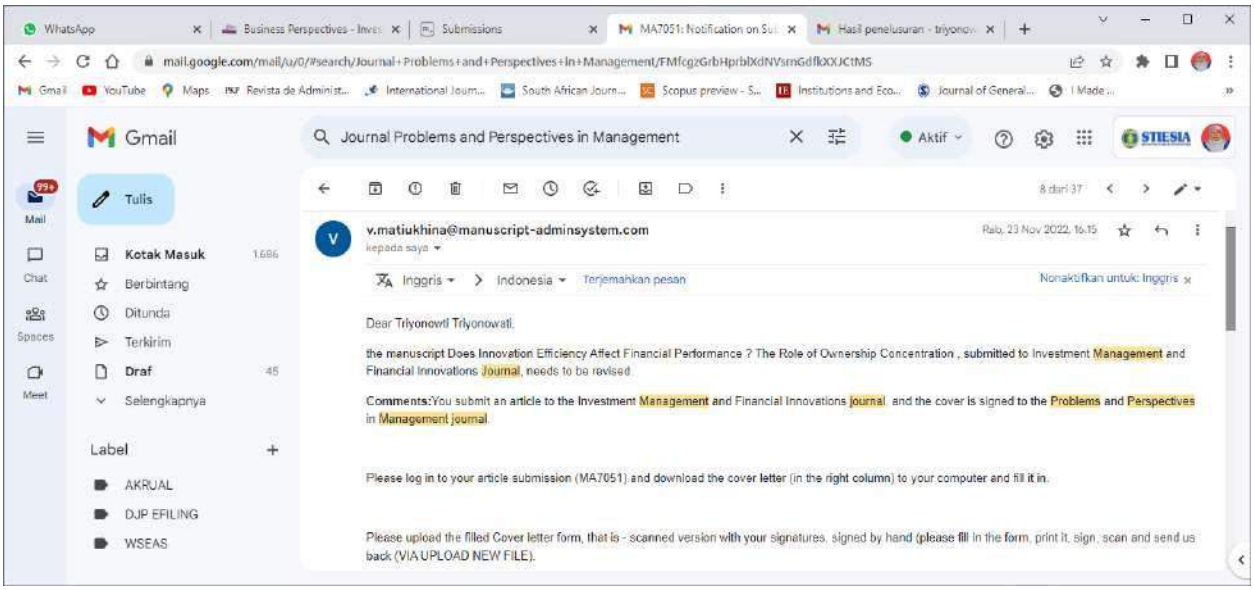
ORCID: 0000-0002-3688-7171

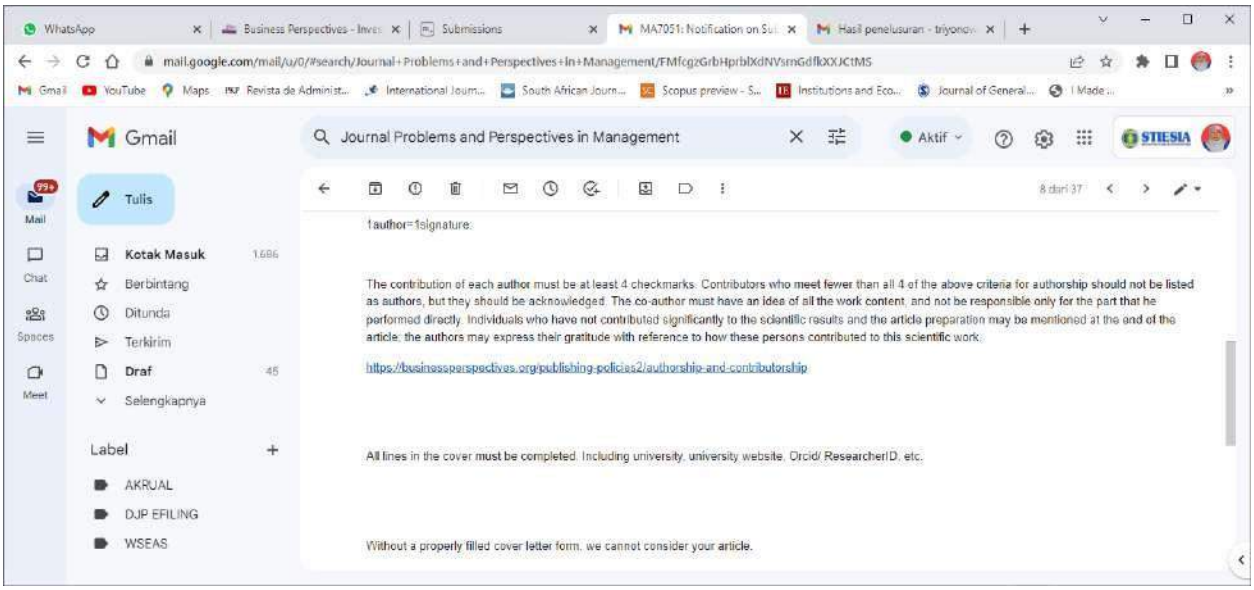
Researcher ID: N/A

Kind regards,

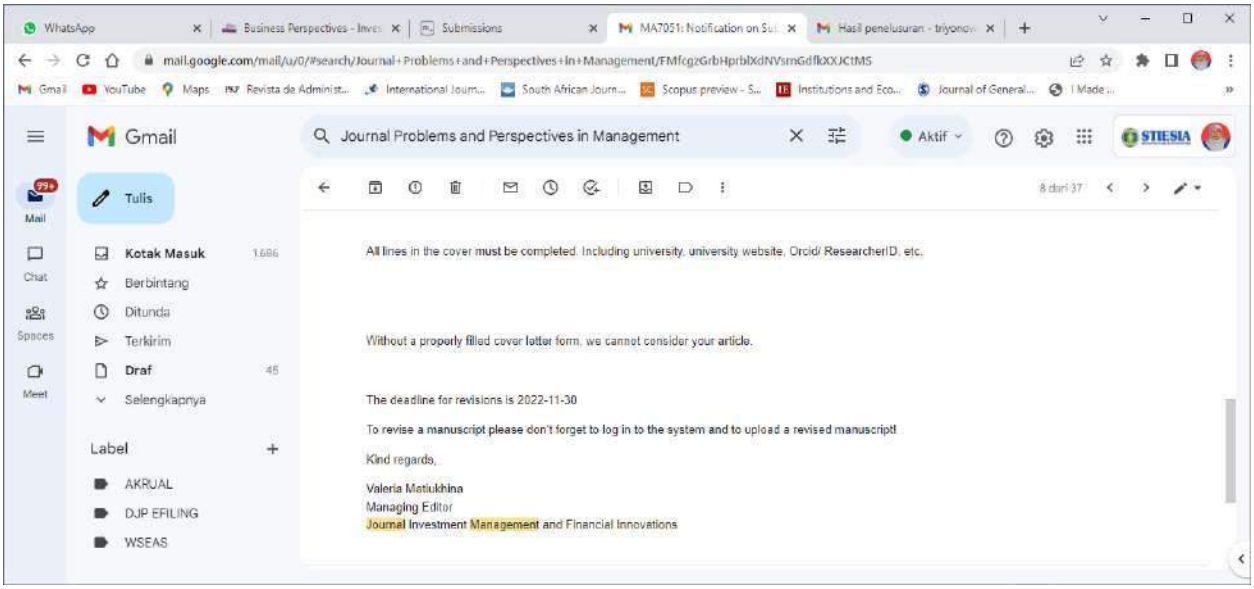
undefined

Revision Submission Paper – 2





Keterangan: Bukti item 2.2. (Hal 18-22)



Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments: You submit an article to the Investment Management and Financial Innovations journal, and the cover is signed to
the Problems and Perspectives in Management journal.

Please log in to your article submission (MA7051) and download the cover letter (in the right column) to your computer and fill it in.

Please upload the filled Cover letter form, that is - scanned version with your signatures, signed by hand (please fill in the form, print it, sign, scan and send us back (VIA UPLOAD NEW FILE).

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The contribution of each author must be at least 4 checkmarks. Contributors who meet fewer than all 4 of the above criteria for authorship should not be listed as authors, but

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The deadline for revisions is 2022-11-30

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Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations

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COVER LETTER

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Researcaa ID:
Submission date: 23/M/2012

Conceptualization	UI I ^°e*I8^!! n	M	SoftMare	M I Writing - original draft	☒
Data curation	|X'.| I Methodology	☐	Supervision	L ! | Writing - review & editing	☒
Formal analysis	—J | Project administration		Validation		
Funding acquisition	@ | Resources	M	L Visualization		

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Submission date: 23/11/2021
Author Contributlous:

COnce tua1lzation	M | Investlgation		Software	||| Writing - on nal draft	☐
Data curation	|_| et odology		Supervision	{_| | Writing - reyiew & editing	☐
Formal analysis	J_J | Project administration	☒	Validation		
Fundin acquisition	Dirs	☒	Visualization		

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Researcher ID:
Submission date: 23/11/2022

Conce@ Lializatlon	{_I | Invenigatlon	@§	Software	§'9 | Writing - ongInal drah	☐
Data curation	| | Methodology	0'§	Supervision	@ | Writing - review & edning	☐
Formal analysis	M—| Prgiect administration	L I	Validation		
Funding acquisition	M—| Resources	| i	Visualization	NJ	

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ORCID: 0X XI01-6951-1042
Submission : 23/11/2032

Conceptualization	gg | Investigation	|_|	Software	{_| Writing - onginal draft	☐
Data curation	|_| Methodology	|_|	Supervtsion	—| Writing - rev›ew & editing	☐
formal analysis	|_| I Project administration	|_|	Validation	@ I	
fiunding acquisition	|_| j Resources	|_.|	Visualization	☒	

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Conceptualization	[ ] Investigation		Software	[ ] Writing - original draft			
Data curation	[ ] Methodology	[ ]	Supervision	[ ] Writing – review & Editing	[ ]		
Formal analysis	[ ] Project admlnistration	[ ]	Validation	[ ]			
Funding acquisition	Resources		Visualization	[ ]			

ACKNOWLEDGEMENT(S):

Dear Editor,

Aached is the manuscript tided «Does Innovation Efflcle Effect finandat Performance ? Role of Ownership Concentration» to be considered for publicaoon in the «Investment Management and 8!88^ ^ ***J*

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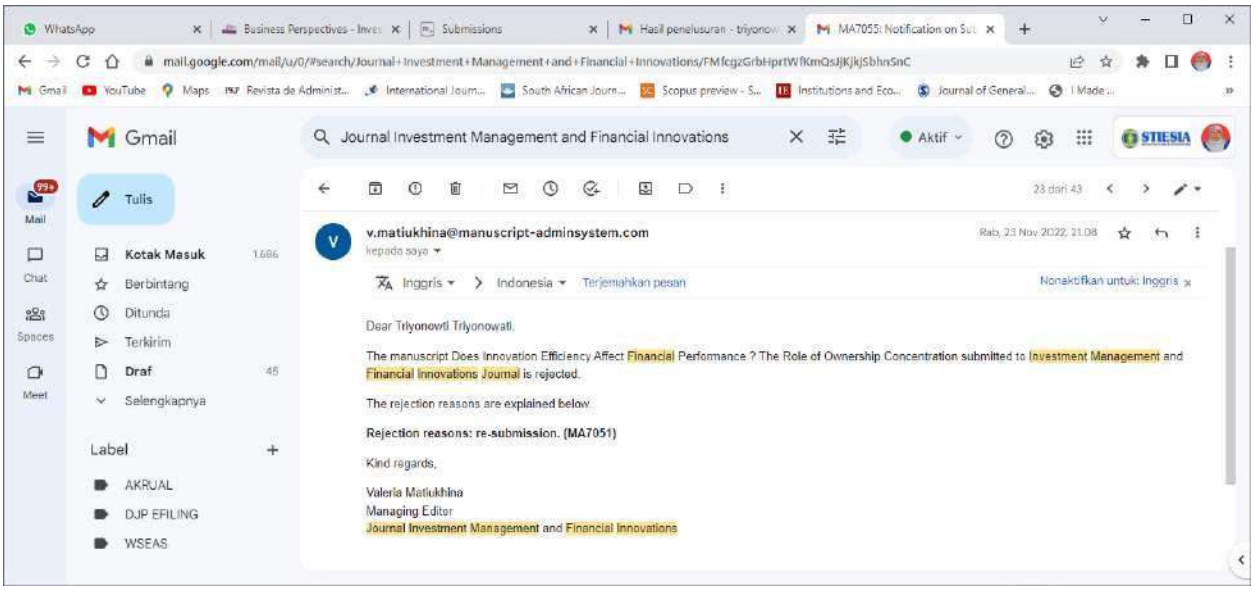
Decisions Paper (Rejected) - 2



Dear Triyonowti Triyonowati,

The manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration submitted
to Investment Management and Financial Innovations Journal is rejected.

The rejection reasons are explained below.

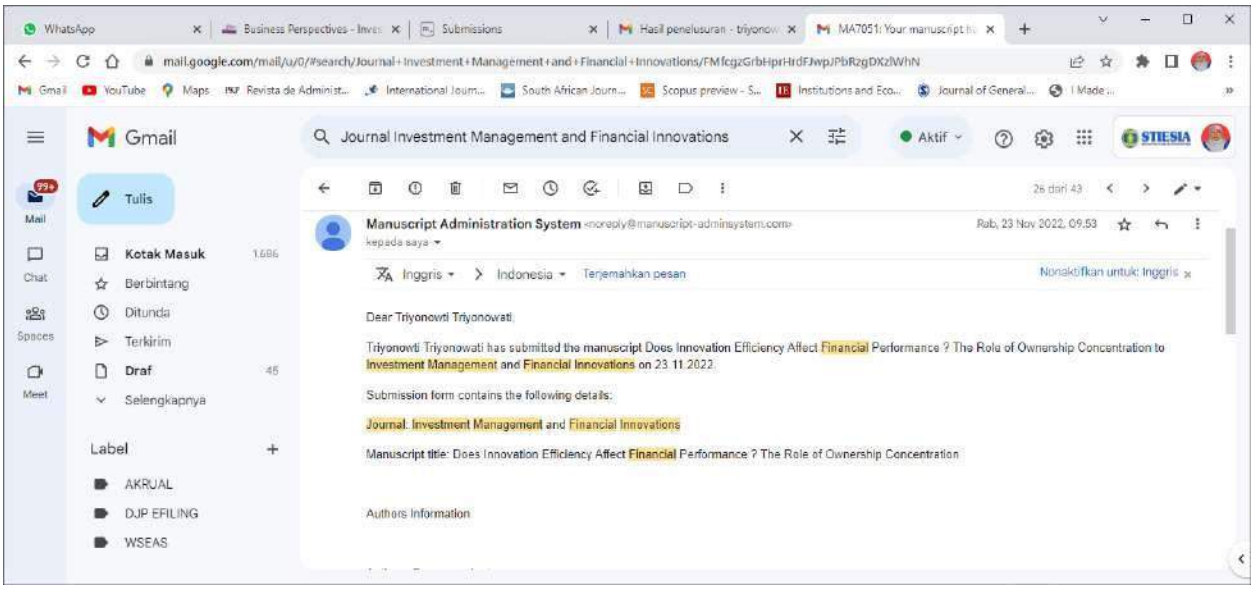
Rejection reasons: re-submission. (MA7051)

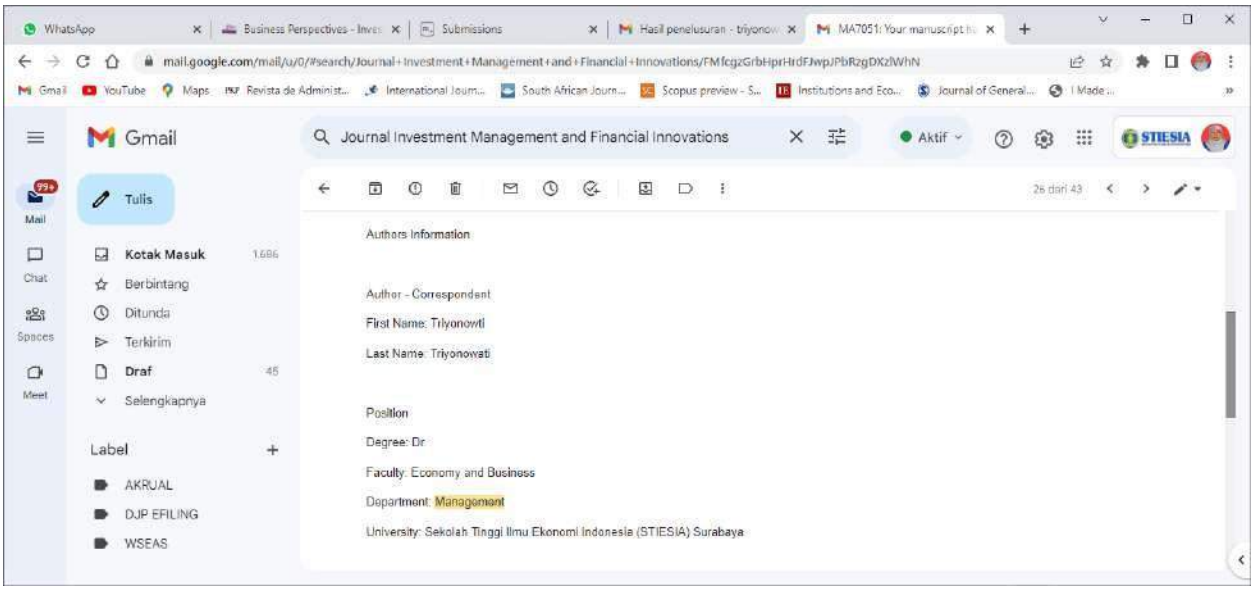
Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations

Keterangan: Bukti item 2.3.(Hal 23)

SubmissionLetter - 3





Dear Triyonowti Triyonowati,

Triyonowti Triyonowati has submitted the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration to Investment Management and Financial Innovations on 23.11.2022.

Submission form contains the following details:

Journal: Investment Management and Financial Innovations

Keterangan: Bukti item 3.1.(Hal 23-26)

Manuscript title: Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration

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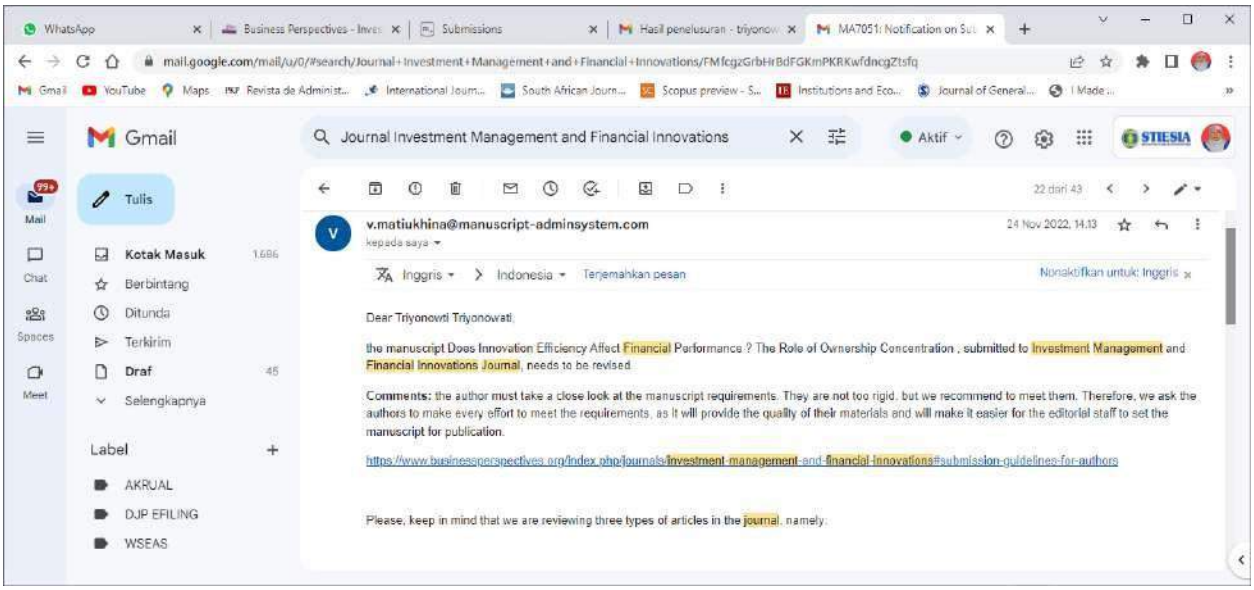
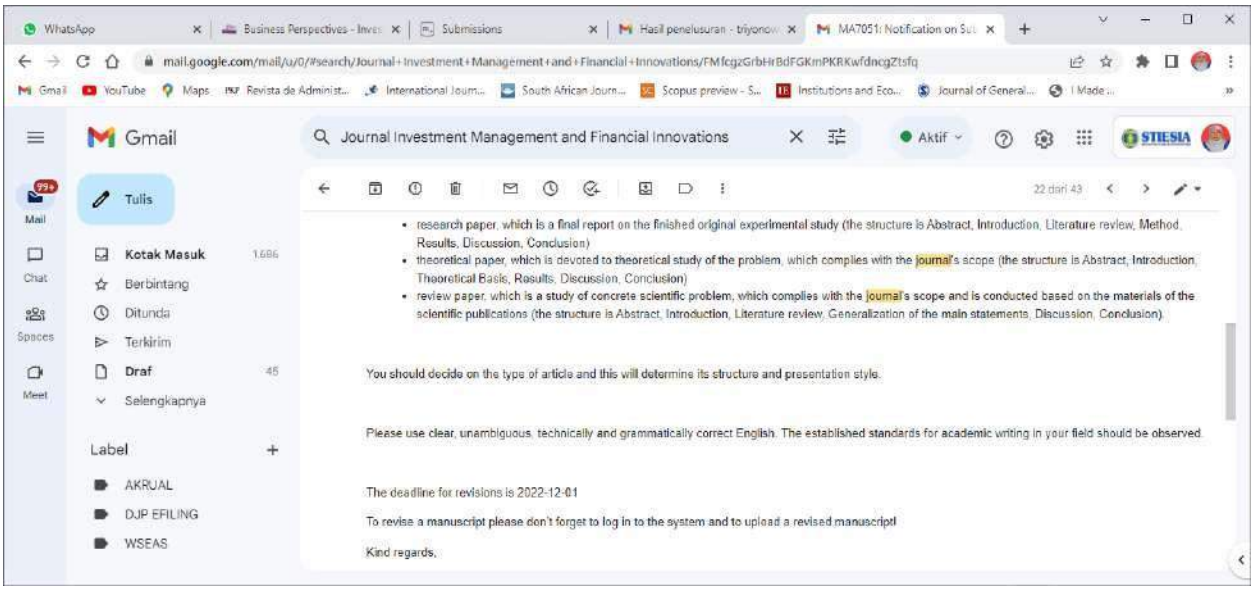
Kind regards,

undefined

Revision Submission Paper – 3





Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted
to Investment Management and Financial Innovations Journal, needs to be revised.

Comments: the author must take a close look at the manuscript requirements. They are not too rigid, but we recommend to meet them. Therefore, we ask the authors to make every effort to meet the requirements, as it will provide the quality of their

Keterangan: Bukti item 3.2. (Hal 27-36)

materials and will make it easier for the editorial staff to set the manuscript for publication.

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Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations

DOES INNOVATION EFFICIENCY AFFECT FINANCIAL PERFORMANCE ? THE ROLE OF OWNERSHIP CONCENTRATION

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Abstract

The company that is synonymous with the application of science and technology is the manufacturing industry (Krmela et al., 2022). Manufacturing companies in Indonesia have been accustomed to the use of technology in their production activities so far, because technology really helps the company's production to be more effective (Muchran, 2020). This study examines the effect of innovation efficiency on firm performance and the moderating role of ownership concentration on this effect. This study examines innovation efficiency as the optimal combination of innovation input and innovation output. The inputs used are research and development expenses, machine repair expenses, and information technology purchases. Meanwhile, the output of innovation. This research used 616 annual reports of manufacturing companies from 2013 to [illegible] technique used is a moderated regression analysis. The results show that efficiency is positively and significantly correlated with company performance. In addition, the results of the study provide evidence of concentrated ownership, encouraging managers to be more intensive in carrying out innovation efficiency so that it affects increasing company performance. These findings show that there is efficiency in innovation projects that can improve company performance, and companies with concentrated ownership find it easier to carry out innovation efficiency because of the active involvement of shareholders in the management process when innovation projects are carried out to provide benefits to improving company performance.

Keywords: Industries management, firm strategy, market performance, corporate financial management, sustainable development financing.
JEL Classification Code: F63, L16, M11, M21, O11.

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The abstract has been revised

INTRODUCTION

Changes in the industrial environment that are increasingly dynamic today and in the future will force all manufacturing companies to use technology as to support their production activities (Yeung, 2021). Innovation provides space for companies to seize new opportunities and improve company competitiveness (Lestari et al., 2020). Companies that cannot to innovate impact on the abandonment of the company's products, a decline in the production cycle, and losing the company's position in the market environment (Jensen, 2021).

Innovation drives companies to discover and create new ideas, take risks, and encourage new business approaches (Sanchez-Henriquez & Pavez, 2021). Companies are also required to produce quality products or services at low costs, improvise products with new attributes and produce products that differ from the previous ones from the innovation activities carried out (Jensen, 2021). Therefore, innovation is an important effort that must be carried out by every company in the modern era in order to win the competition, maintain sustainability, and improve company performance. Innovation efficiency reduces unnecessary burdens to defend themselves in a competitive environment, so that the innovations carried out do not have a significant impact on the decline in company performance (Grabowska & Saniuk, 2022). Management's ability to properly calculate the

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carried out (Jensen, 2021). Therefore, innovation is an important effort that must be carried out by every company in the modern era in order to win the competition, maintain sustainability, and improve company performance. Innovation efficiency reduces unnecessary burdens to defend themselves in a competitive environment, so that the innovations carried out do not have a significant impact on the decline in company performance (Grabowska & Saniuk, 2022). Management's ability to properly calculate the efficiency of innovation can provide benefits to efforts to meet consumer preferences without placing an excessive burden on company resources (Adomah Worae & C. Ngwakwe, 2017). Innovation efficiency is defined as the company's ability to translate innovation inputs into innovation outputs (Türkeş et al., 2021). Although innovation is not a linear process of changing innovation inputs into innovation outputs, studying how the resources used as innovation inputs provide optimal output explain of the concept of innovation efficiency (Türkeş et al., 2021).

Good corporate governance can design innovation effectively, so that efficiency can be built properly in the innovation process (Yin & Sheng, 2019). Ownership is the foundation of corporate governance because a company cannot exist without owners and share ownership rights are allocated to owners (Aguilera & Crespi-Cladera, 2016). Ownership contributes to value creation, builds a long-term company vision, and take a part in allocating company resources (Ma et al., 2022). Regarding innovation, ownership structure encourages management to increase innovation activities, especially concentrated ownership structure (Shehadeh et al., 2022). Innovation investments that involve high costs and high risks are a hard choice for companies with dispersed ownership structures (Khan et al., 2021). The dispersed ownership structure creates enormous differences in views between each owner so that it becomes an obstacle for companies to invest in innovation (Ma et al., 2022). In addition, companies with a concentrated ownership structure more easily absorb organizational culture that leads to innovation activities (Shehadeh et al., 2022).

Concentrated ownership encourages managers to increase innovation activities for the growth and sustainability of the company in the future (Ma et al., 2022). Innovation can be well received by managers if efficiency can be carried out in innovation activities (Jensen, 2021). Managers don't miss the opportunity to maximize non-corporate value that benefits their position and interests. The effectiveness of resource allocation when innovation efficiency is carried out results in lower innovation input costs than the resulting output. Innovation is aimed at improving the company's performance in the long term (Yin & Sheng, 2019). The company's performance improvement is carried out by seeking a better market position through product and process innovation (Kurniawati et al., 2022). New products and services resulting from the innovation process generate new market share, the ability to create prices, to encourage increased company profitability (Tarigan et al., 2019).

There is a lack of models to track the effect of various types of innovations on firm performance over time, so future research is recommended to validate the findings of previous studies and present an integrative research framework that simultaneously covers the influence of innovation and firm performance (Agostini et al., 2017). This research looks at this opportunity and examines the efficiency of innovation as an integrative framework for innovation. Efficiency is an important concept in innovation, because investing in innovation is not an activity that company management wants (Türkeş et al., 2021).

Table Paragraph

1. LITERATURE REVIEW

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Literature review has been adjusted

Principal-agent problems usually arise in a firm's innovation activities (Hang et al., 2018). Innovation is very important to maintain a company's competitive advantage, but it requires a lot of time and investment of resources that contributes to the decline in the company's short-term operational performance (Ali & Anwar, 2021). Managers will choose not to invest heavily in innovation activities and prefer steady performance improvements. Managers have an interest in increasing their wealth, so they have a tendency to reject innovation activities that require large financing (I. M. L. M. & I. M. N. Jaya, 2020). Innovation efficiency gives managers the opportunity to increase their wealth, because the enormous cost of innovation can be offset by a much greater increase in revenue (Grabowska & Saniuk, 2022) and Zandi et al. (2019). This results in the company's short-term performance being maintained and having the hope of increasing when innovation

innovation activities that require large financing (I. M. L. M. & I. M. N. Jaya, 2020). Innovation efficiency gives managers the opportunity to increase their wealth, because the enormous cost of innovation can be offset by a much greater increase in revenue (Grabowska & Saniuk, 2022) and Zandi et al. (2019). This results in the company's short-term performance being maintained and having the hope of increasing when innovation efficiency is carried out. Shareholders' expectations that managers increase innovation activities can be realized if the efficiency of innovation can be fulfilled properly (Zandi et al., 2019). This shows that innovation efficiency is a strategy to bridge the interests of principals and agents when the company has the intention of increasing innovation activities.

Innovative companies are more flexible and more adaptable to the business environment, increasing opportunities better than competitors (Almulhim, 2020). Without continuous development and innovation, it will disrupt the company's internal conditions and impact on the imbalance between supply and demand in the market (Ruiter et al., 2022). This makes managers have no desire to carry out innovation projects to maintain the company's short-term performance growth (IMLM & IMN Jaya, 2020). Innovation must consider efficiency factors in order to reduce the excessive burden on the use of company resources (Grabowska & Saniuk, 2022). Innovation efficiency has an important role in an increasingly complex business environment where innovation efficiency can reduce unnecessary burdens to defend themselves in a competitive environment.so that the innovations carried out do not have a significant impact on improving the company's performance (Kafetzopouloset al., 2019).

Innovation comes from the company's desire to develop products that are differ from competitors, create new products according to consumer preferences, and shorten the production cycle (Tavassoli and Karlsson, 2015). Products and processes resulting from innovation activities create and develop market share, increasing sales volume. To achieve this, R&D is needed for customers, competitors, and company resources (Haryati et al., 2021). R&D causes the company's cash expenditure to increase, so efficiency is needed so as not to disrupt the company's cash flow. The efficiency of innovation optimally combines of using innovation inputs to produce greater output (Zandi et al., 2019). Innovation efficiency makes it easy for companies to expand their market share without placing an enormous burden on the company's operational activities, so that companies have the convenience of increasing sales volume, as well as improving performance (DC Chen & Chen, 2021). In addition, new products resulting from innovation activities make the company a market leader, so that it is easy to determine prices for these new products (De et al., 2020). This resulted in the company's revenue increasing from the addition of market share and the ability to shape prices. This shows that innovation efficiency is a strategy to improve company performance while remaining actively involved in the competitive environment (Qiao & Fung, 2016) and Yan et al. (2019).

Companies with a concentrated ownership structure encourage managers to be more active in exploring forms of innovation that the company can develop (Mustafa et al., 2020). Concentrated ownership provides an injection of funding to finance investments in innovation to meet its expectations for future growth in the company's performance and increasing their prosperity (Gamariel et al., 2022). The large investment costs create the possibility for managers to get a smaller return from the performance they have done (Jensen, 2021). Agency problems that arise between principals and agents when innovating must be minimized as best as possible, so that companies can survive in a competitive environment and obtain better sustainability in the future.

Active involvement of shareholders in the management process to influence managers' innovative efforts is a form of effort to resolve problems that arise among actors in innovation activities (Xie et al., 2019). Shareholders can use their ownership position to actively influence

operations or management when they are not satisfied with the implementation of the innovation strategy (Dilla et al., 2019). Shareholders help improve the risk-taking process by managers, so managers are motivated to increase the company's innovation activities (Eroglu & Sanders, 2021). Shareholders have the expectation that their profits will increase if they can influence the actions of managers to innovate (Xie et al., 2019). Companies with concentrated

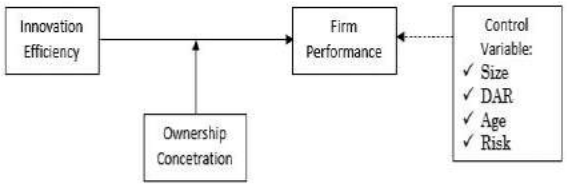
operations or management when they are not satisfied with the implementation of the innovation strategy (Dilla et al., 2019). Shareholders help improve the risk-taking process by managers, so managers are motivated to increase the company's innovation activities (Eroglu & Sanders, 2021). Shareholders have the expectation that their profits will increase if they can influence the actions of managers to innovate (Xie et al., 2019). Companies with concentrated ownership will be more aggressive in increasing innovation due to the active involvement of shareholders in the management process. Shareholders seek to encourage managers to support their initiatives to create innovations in business processes through efforts to increase innovation activities.

Companies with a concentrated ownership structure encourage management to increase the company's innovation activities by considering cost efficiency when innovation is carried out (Gamariel et al., 2022). Innovation efficiency increases when the company's ownership structure is more concentrated due to the active involvement of shareholders in the management process (Yuan et al., 2020). Concentrated ownership roles to be actively involved in innovation activities provide tighter supervision to managers, so managers are more motivated to innovate and maintain cost efficiency (Yuan et al., 2020). The cost efficiency created during the innovation process has an impact on increasing market share, increasing sales volume, and minimizing operational costs (Exposito & Sanchis-Llopis, 2018). This makes it easy for company managers to improve company performance (Muthuveloo et al., 2017). In addition, concentrated ownership encourages company management to carry out innovation efficiency in order to minimize the current use of cash, so that cash disbursements can be maintained (Gamariel et al., 2022). This gives hope to managers to keep getting higher returns when innovation activity increases. Therefore, this study formulates the hypothesis that:

H1: Innovation efficiency has a positive effect on company performance

H2: Concentrated ownership increases the effect of innovation efficiency on company performance

Figure 1. Conceptual Framework



2. METHOD

The research method uses quantitative methods. This research data used in this study is secondary data. This population are manufacturing companies listed on the Indonesia Stock Exchange. This sample used was 616 data on manufacturing companies in Indonesia.

Table 3.1. Definition and measurement of research variables

No.	Variable	Indicators/measurements	Scale
1.	Firm performance, The measurement of the company's performance in question is only those that are directly related to innovation, which is difficult to determine (Wang & Wang, 2012).	$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$	Ratio
2.	Innovation Efficiency, provides a basic explanation of how the use of resources as input for innovation provides optimal results (Qiao & Fung, 2016).	Innovation efficiency is obtained by operationalizing the input and output of innovation in the non-parametric mathematical method of Data Envelopment Analysis (DEA). To estimate the efficiency of innovation by using 3 inputs, namely: research and development expenses, engine repair	Ratio

		expenses, and technology purchases and 1 output (Erkan et al., 2019). $hs = \frac{\sum_{i=1}^{m} Ui.Yis}{\sum_{j=1}^{n} Vj.Xjs}$	
3.	Ownership Concentration, has an important function in innovation projects (Belloc, 2012).Ownership concentration used in this study is concentrated ownership, because the dispersed ownership structure creates large differences in views between each owner so that it becomes an obstacle for companies to invest in innovation.	Ownership concentration is calculated based on the hi-difference of the controlling shareholder (Shehadeh et al., 2022). This study uses the 3 largest controlling shareholders, so thatownership concentration is formulated: **OC = (Equity1 - Equity2)2 + (Equity2 - Equity3)2**	Ratio
4.	Size Firm (control), used to estimate company size because companies with large assets have the opportunity to explore and exploit innovation activities. Therefore, companies with large assets have a high opportunity to increase innovation projects and make projects efficient (Cruz-Cázares et al., 2013).	*Ln total assets* (proxied by total assets)	Ratio
5.	Capital structure (control), is used to measure capital structure because companies with large capital structures have the possibility to fund innovation activities (Lin, 2017).	$Debt\ to\ Equity = \frac{Total\ Liabilities}{Total\ Equity} X\ 100\%$	Ratio
6.	Firm age (control),The age of the company indicates the maturity of the company in a competitive environment, where companies with a large age have more experience in business operations, making it easier to win the competition.(Cruz-Cázares et al., 2013).	Calculated from the year of establishment to the present	Nominal
7.	Firm risk (control) shows the consequences of actions taken by company managers. Innovation is an activity that has a large risk, so the risk that the company currently has is a consideration for innovation efficiency in order to improve company performance.	Company risk is calculated using the standard deviation of EBITDA (Earning Before Interest, Tax, Depreciaton, and Amortization) divided by the company's total assets. The formula for the standard deviation of EBITDA is as follows: $CR = \sqrt{\frac{n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_1)^2}{n(n-1)}}$ Where n is the number of data and1 is EBITDA. So the formula for calculating company risk is: **Risk = EBITDA Standard Deviation / Total Assets**The greater the company's risk indicates that the company's executives are risk taking, the smaller the company's risk indicates that the company's executives are risk averse	Ratio

Source: Data tabulation, 2022.

This study conducted data analysis and statistical testing using SPSS 24.0 to analyze descriptive statistics, correlation analysis, multiple linear regression and moderated regression analysis. Multiple linear regression was used to test hypothesis 1, while moderated regression analysis was used to test hypothesis 2. The model developed to measure the effect of innovation efficiency on company performance (hypothesis 1) was as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 SIZE + \beta_3 DER + \beta_4 AGE + \beta_5 RISK + \varepsilon$$

While the model developed to measure ownership concentration moderation on the effect of innovation efficiency on company performance (hypothesis 2) is as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 OC + \beta_3 EFF*OC + \varepsilon$$

Information:

ROA : Financial Performance
EFF : Innovation efficiency
OC : Ownershipconcentration
SIZE : Size firm
DAR : Capital structure
AGE : Firm age
RISK :Firm risk

3. RESULTS

In Table 1 provides information on the number of companies that carry out product innovation efficiency during the period 2013 to 2019.

Table 1. Manufacturing companies that carry out product efficiency for the period 2013-2019

Year	Number of Companies	Number of Efficient Companies	%
2013	86	2	2.33
2014	90	2	2.22
2015	89	2	2.25
2016	81	2	2.47
2017	85	3	3.52
2018	94	3	3.19
2019	91	3	3.29

Source: research data, 2019.

The results of table 1 show that the efficiency of innovation is still minimal by manufacturing companies in Indonesia. This indicates that manufacturing companies in Indonesia have not been able to optimize the use of their resources for innovation activities.

Table 2 provides descriptive statistical results of the variables in this study. Here are the results of the test data.

Table 2. Descriptive statistics

	N	Minimum	Maximum	mean	Std. Deviation
ROA	616	-0.401425	4.446758	0.044370	0.084450
EFF	616	0	1	0.044126	0.175878
OC	616	0.000000	0.992813	0.282687	0.2893058
DER	616	1,267	23.201	9.0281	11.2034
SIZE	616	10,392	24,918	22.9281	25,9291
AGE	616	5	7	3.4029	5,7261
RISK	616	-1.750198	2,64381	0.115318	0.547381
Valid N (listwise)					

Source: research data, 2019.

From a sample of 616 manufacturing company data for the period 2013 to 2019, the company's performance shows a range of values of -0.401425 to 4.446758 with an average of 0.044370 and a standard deviation of 0.084450. This shows that the sampled companies have different abilities in improving their performance. Innovation efficiency shows that it has a value range of 0 to 1 with an average of 0,044126and standard deviation 0,175878. These results indicate that there are still companies that have not been able to carry out innovation efficiency, and companies that have the ability to carry out innovation efficiency are still very low. Ownership concentration shows a range of values from 0 to 0,992813 with an average of 0,282687 and standard deviation 0,2893058. These results indicate that in general manufacturing companies in Indonesia have a concentrated ownership structure, but there are companies that have scattered shareholdings. The average debt to equity ratio obtained is 9.0281 and the standard deviation is 11.2034. While the minimum value is 1,267 and the maximum is 23,201. This result means that manufacturing companies in Indonesia that have a higher Debt to Equity Ratio value, the higher the amount of debt that must be paid off by the company within a certain period of time. The firm risk value that has been tested produces a minimum value of-1.750198 and the maximum value is 2.64381. Meanwhile, the average value is 0.115318 and the standard deviation value is 0.547381. This result means

that sthe higher the risk of a company which includes a high risk of uncertainty demand, then this poses a risk The company's income is uncertain. Where with the uncertainty of the company's income, this causes the company's profitability to decrease.

Table 3. Hypothesis testing

Variable	Model 1		Model 2	
	Coef	Sig	Coef	Sig
Constant	-1,247***	0.000	-1,212***	0.000
OC	0.277***	0.001	0.276***	0.001
EFF	0.124***	0.000	-0.021	0.861
ROA	0.213***	0.001	-0.005***	0.000
SIZE	0.482***	0.000	0.483***	0.000
DAR	0.046***	0.000	0.045***	0.000
AGE	0.910***	0.000	-0.032***	0.001
RISK	0.230***	0.001	-0.098***	0.000
EFF*OC	0.402***	0.000	-0.192***	0.000

Source: research data, 2019.

The results from table 3 show that company size, age, and company risk have a positive and significant effect on company performance. In addition, the capital structure has a negative and significant effect on the company's performance. The first hypothesis states that there is a positive effect of innovation efficiency on company performance.

The results of the research on model 1 show that innovation efficiency has a positive and significant effect on company performance with a Beta (ß) value of 0.041 and p-value = 0.021. This result means that the higher the efficiency of innovation by the company, the higher its performance will be. Companies with a high level of efficiency when carrying out innovation projects have the advantage of improving their short-term performance (Peñarroya-Farell & Miralles, 2022).

The results of the research on model 2 show that the interaction of innovation efficiency with ownership concentration has a positive and significant effect on company performance. Based on the existing phenomenon, innovation efficiency makes it easy for companies to increase sales volume, increase sales growth, increase net profit, and minimize investment costs for innovation (Qiao & Fung, 2016). This shows that innovation efficiency is a form of strategy that companies can develop to improve their performance (short or long term) and maintain their sustainability.

4. DISCUSSION

The findings of this study are in line with previous researchers who stated that innovation efficiency is a form of strategy to improve company performance by remaining actively involved in the competitive environment and there are several spaces that companies can develop to improve their innovation efficiency (Trinugroho et al., 2022). The innovations made provide a better opportunity to become market leaders, so they are able to determine the price level for the new products they create (MA Chen et al., 2019). The amount of costs incurred by the company to fund innovation projects can be minimized by managers when efficiency is carried out properly. Managers will choose the optimal use of resources, so that the resulting innovation is in accordance with market needs.

The results of this study mean that the more concentrated shareholder ownership, this will encourage managers to be more active in making efficiency in innovation projects, so that it has an impact on increasing company performance. Concentrated ownership also encourages management to increase innovation projects to improve the company's position in the competitive environment. Concentrated ownership expects the company to be able to maintain a competitive advantage and increase the company's competitiveness with the company's innovations. The drive for concentrated ownership of managers is manifested by the direct involvement of shareholders in innovation projects. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners.

Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers.

The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers (Shehadeh et al., 2022). The direct involvement of concentrated ownership in innovation projects provides opportunities for companies to maintain competitive advantage and improve company performance. The findings of this study are in line with previous findings which state that concentrated ownership has an important role in innovation projects, so that it makes it easier for companies to improve their performance (Chatterjee & Bhattacharjee, 2020).

CONCLUSION

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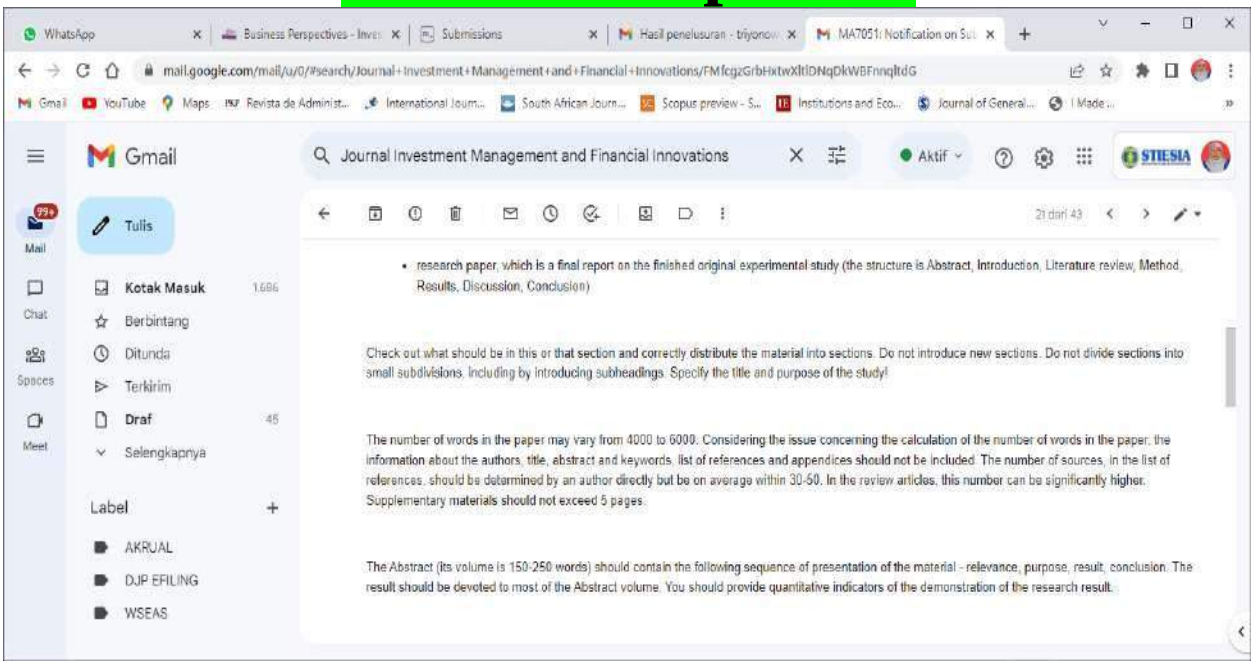
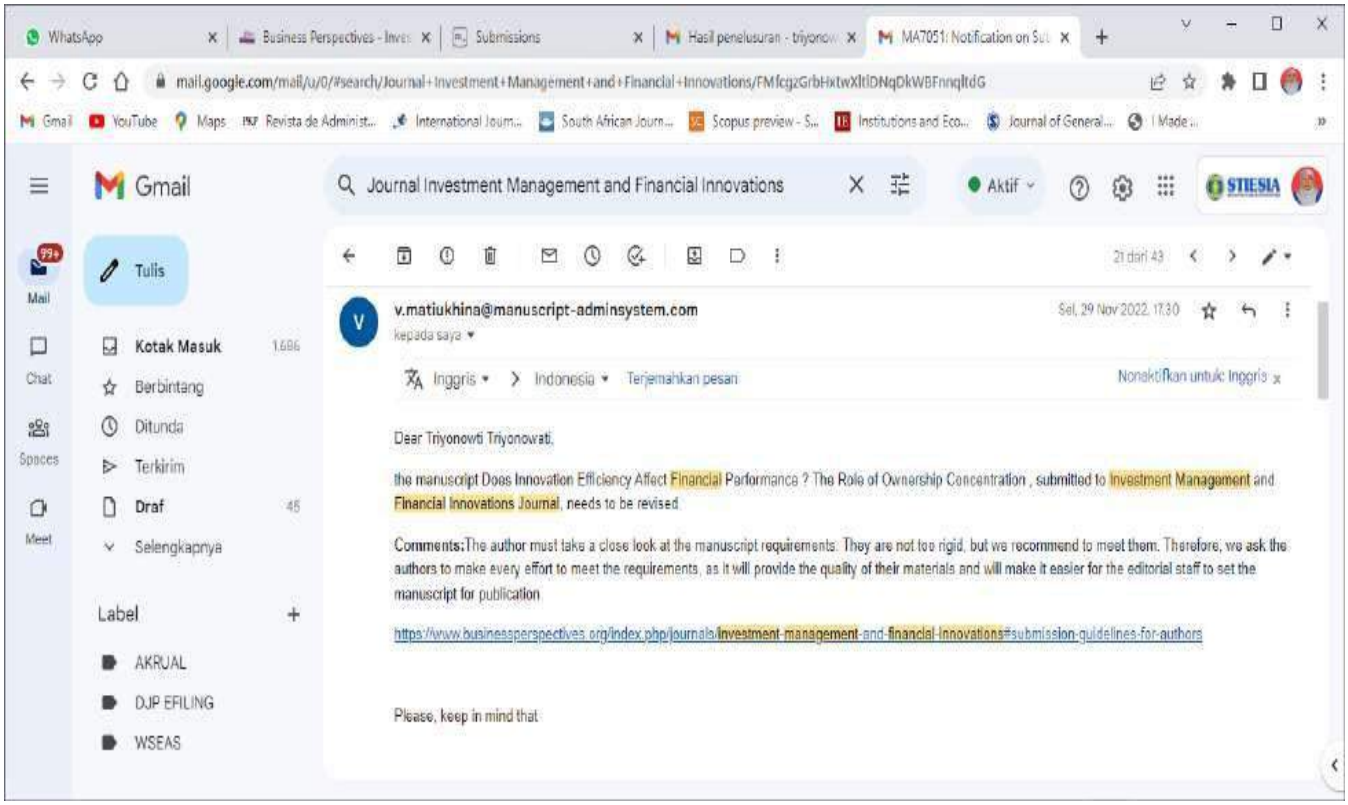
This study finds the fact that manufacturing companies in Indonesia are still lacking in innovation efficiency, so they have vulnerabilities in facing global competition. Indonesia has a goal to become one of the developed countries in the world economy. Therefore, it is important for every company in Indonesia to continuously develop innovations in their products or production processes to support these goals. Innovation is a strategy for every company in Indonesia to be able to compete with the global competitive environment. Therefore, the innovative strategy undertaken, it is necessary to consider efficiency in the project financing process. Innovation efficiency provides an opportunity for each company to develop its business processes without placing great pressure on company resources (Grabowska & Saniuk, 2022). In Indonesia, the corporate ownership structure is dominated by concentrated ownership. This condition makes it easier for each company to carry out innovation projects and make efficiencies due to the strong encouragement of the company owners. Concentrated ownership can encourage managers to improve the company's innovation projects to maintain performance growth, maintain competitive advantage, and maintain company viability (Shehadeh et al., 2022).

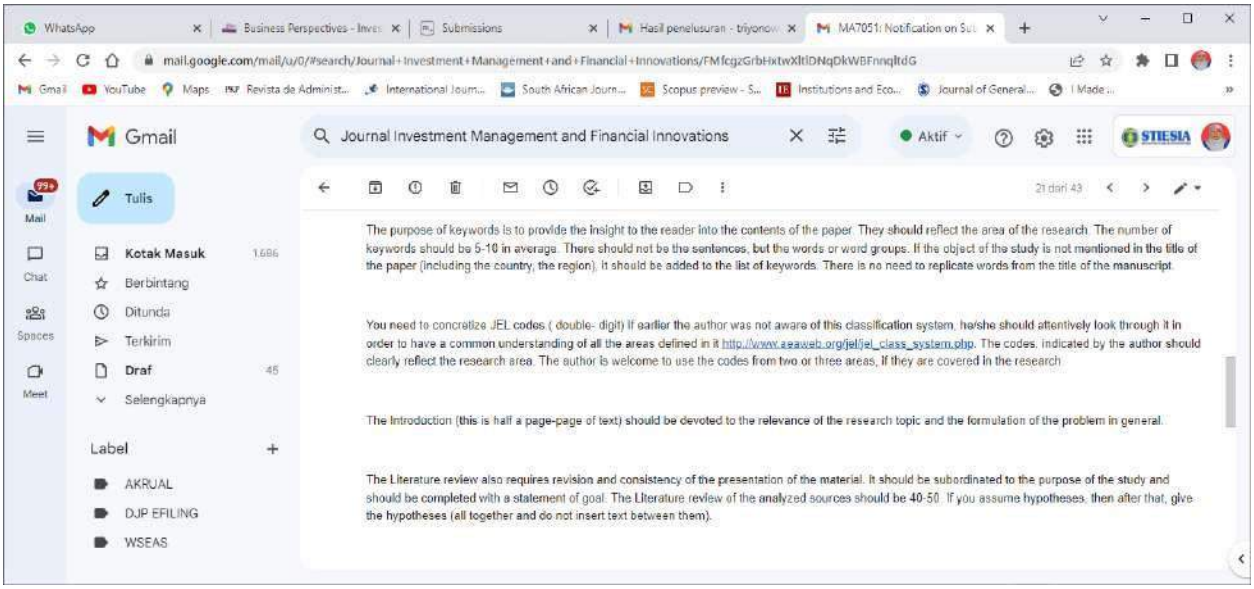
The limitation of this research is that this finding has not technically explained the steps that need to be taken by entrepreneurs to carry out the efficiency of product innovation they produce. Thus, this limitation can be covered by the existence of further research in the future that will examine the strategic steps that need to be taken by entrepreneurs to carry out product innovation efficiency, so that their business performance can continue to develop and be competitive and have a competitive advantage in the future. This finding provides a signal for several stakeholders to start controlling the innovation work carried out by the company's management, the aim is to form budget efficiency and the effectiveness of innovation products in the future.

Revision Paper – 6



Keterangan: Bukti item 3.3.(Hal 37-45)

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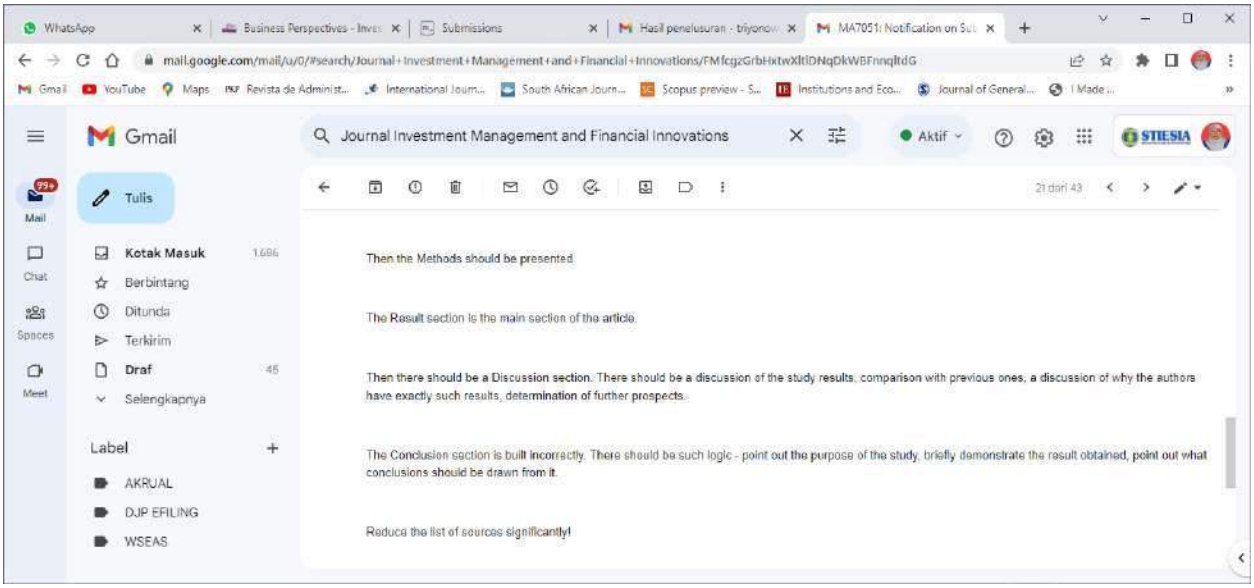
You need to concretize JEL codes (double- digit) if earlier the author was not aware of this classification system, he/she should attentively look through it in order to have a common understanding of all the areas defined in it http://www.aeaweb.org/jel/jel_class_system.php. The codes, indicated by the author should clearly reflect the research area. The author is welcome to use the codes from two or three areas, if they are covered in the research.
The Introduction (this is half a page-page of text) should be devoted to the relevance of the research topic and the formulation of the problem in general.
The Literature review also requires revision and consistency of the presentation of the material. It should be subordinated to the purpose of the study and should be completed with a statement of goal. The Literature review of the analyzed sources should be 40-50. If you assume hypotheses, then after that, give the hypotheses (all together and do not insert text between them).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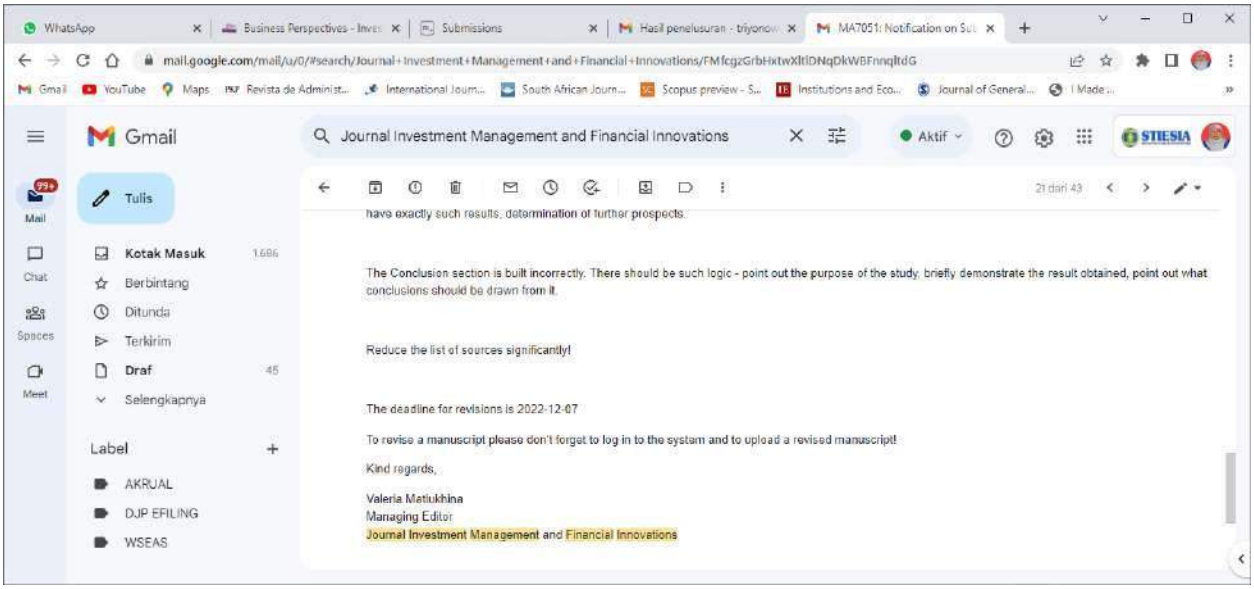
The Result section is the main section of the article.
Then there should be a Discussion section. There should be a discussion of the study results, comparison with previous ones, a discussion of why the authors have exactly such results, determination of further prospects.
The Conclusion section is built incorrectly. There should be such logic - point out the purpose of the study, briefly demonstrate the result obtained, point out what conclusions should be drawn from it.
Reduce the list of sources significantly!



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The Introduction (this is half a page-page of text) should be devoted to the relevance of the research topic and the formulation of the problem in general.

The Literature review also requires revision and consistency of the presentation of the material. It should be subordinated to the purpose of the study and should be completed with a statement of goal. The Literature review of the analyzed sources should be 40-50. If you assume hypotheses, then after that, give the hypotheses (all together and do not insert text between them).

Then the Methods should be presented.

The Result section is the main section of the article.

Then there should be a Discussion section. There should be a discussion of the study results, comparison with previous ones, a discussion of why the authors have exactly such results, determination of further prospects.

The Conclusion section is built incorrectly. There should be such logic - point out the purpose of the study, briefly demonstrate the result obtained, point out what conclusions should be drawn from it.

Reduce the list of sources significantly!

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Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations

DOES INNOVATION EFFICIENCY AFFECT FINANCIAL PERFORMANCE ? THE ROLE OF OWNERSHIP CONCENTRATION

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Abstract

The company that is synonymous with the application of science and technology is the manufacturing industry (Krmela et al., 2022). Manufacturing companies in Indonesia have been accustomed to the use of technology in their production activities so far, because technology really helps the company's production to be more effective (Muchran, 2020). This study examines the effect of innovation efficiency on firm performance and the moderating role of ownership concentration on this effect. This study examines innovation efficiency as the optimal combination of innovation input and innovation output. The inputs used are research and development expenses, machine repair expenses, and information technology purchases. Meanwhile, the output of innovation. This research used 616 annual reports of manufacturing companies from 2013 to 2018. The analytical technique used is a moderated regression analysis. The results show that efficiency is positively and significantly correlated with company performance. In addition, the results of the study provide evidence of concentrated ownership, encouraging managers to be more intensive in carrying out innovation efficiency so that it affects increasing company performance. These findings show that there is efficiency in innovation projects that can improve company performance, and companies with concentrated ownership find it easier to carry out innovation efficiency because of the active involvement of shareholders in the management process when innovation projects are carried out to provide benefits to improving company performance.

Keywords: Industries management, firm strategy, market performance, corporate financial management, sustainable development financing.
JEL Classification Code: F63, L16, M11, M21, O11.

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The abstract has revised 224 words

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Bukti item revisi 3.3. dengan memperkecil jumlah kata abstrak menjadi 224 kata dan juga menambah referensi terbaru menjadi 46 literature

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References has been revised 46 literatures

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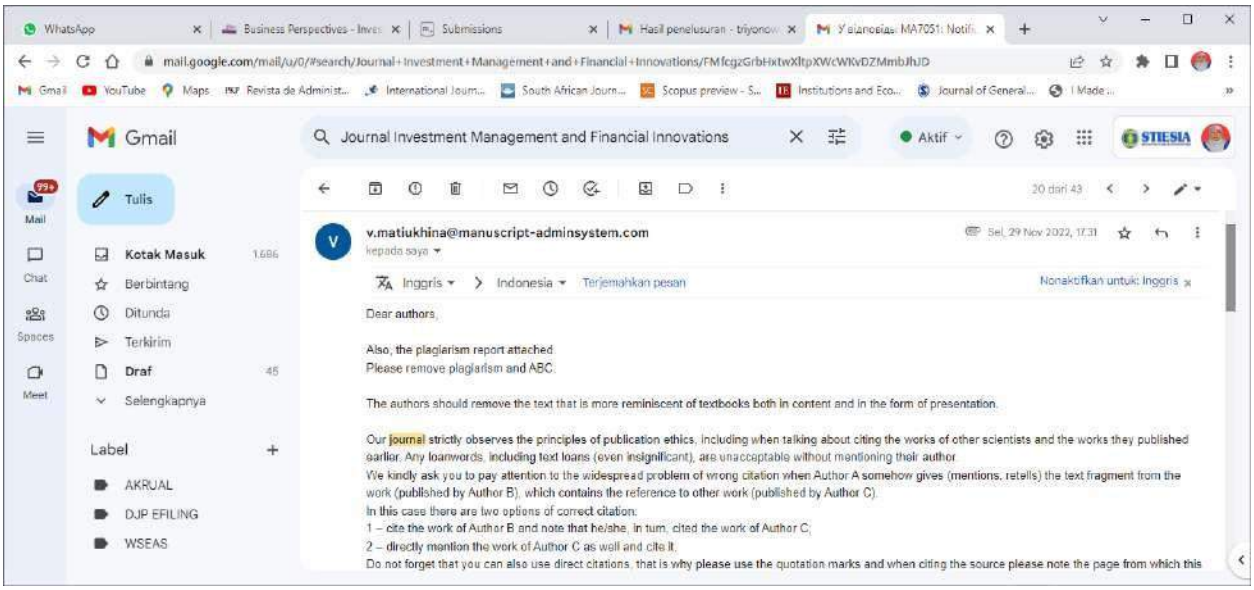

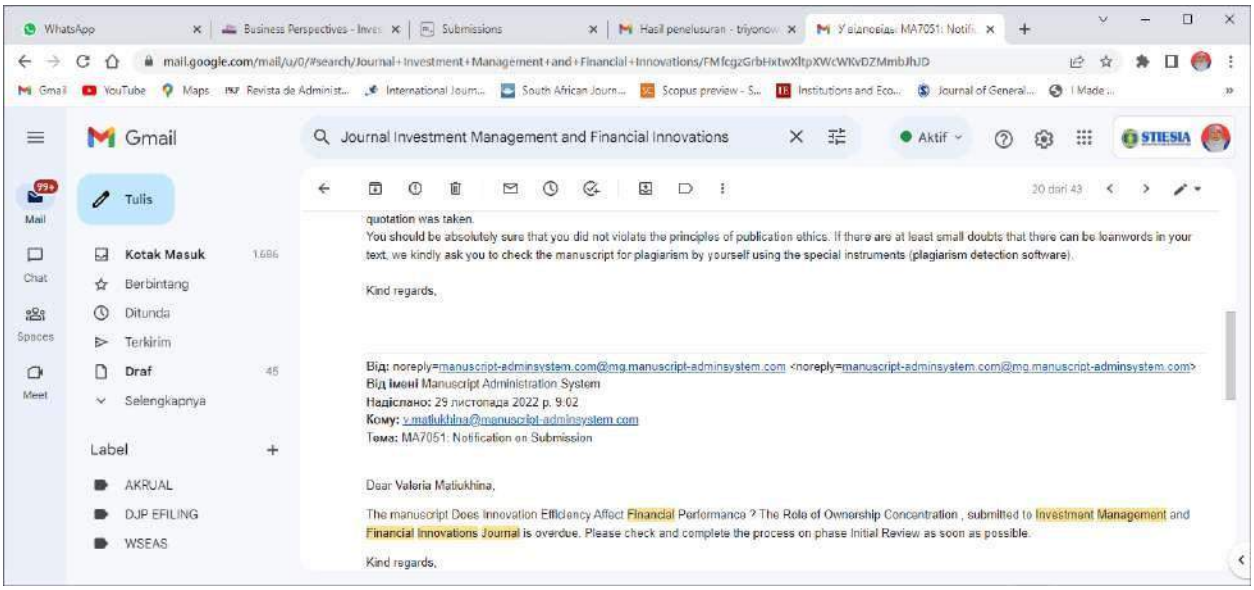

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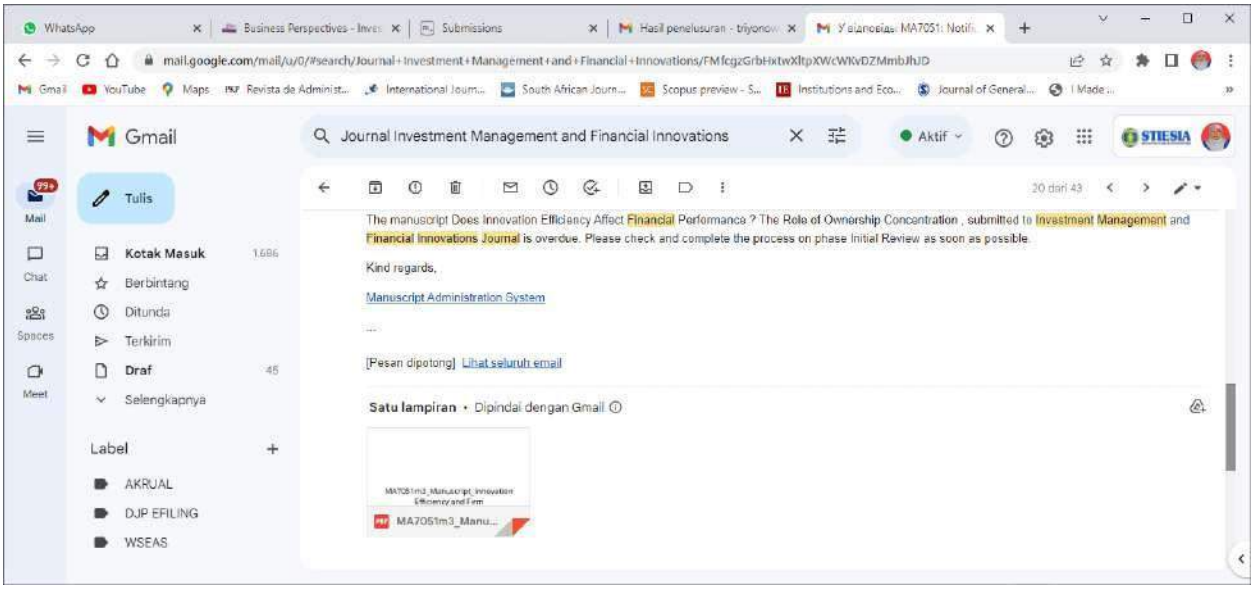

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Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration

Triyonowati[1*], Rizki Amalia Elfita[2], Suwitho[3], Titik Mildawati[4]
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Abstract

This study examines the effect of innovation efficiency on firm performance and the moderating role of ownership concentration on this effect. This study examines innovation efficiency as the optimal combination of innovation input and innovation output. The inputs used are research and development expenses, machine repair expenses, and information technology purchases. Meanwhile, the output of innovation. The sample used is 616 annual reports of manufacturing companies from 2013 to 2018. The analytical technique used is a moderated regression analysis. The results show that efficiency is positively and significantly correlated with company performance. In addition, the results of the study provide evidence of concentrated ownership, encouraging managers to be more intensive in carrying out innovation efficiency so that it affects increasing company performance. These findings show that there is efficiency in innovation projects that can improve company performance, and companies with concentrated ownership find it easier to carry out innovation efficiency because of the active involvement of shareholders in the management process when innovation projects are carried out to provide benefits to improving company performance.

Keywords: Innovation efficiency; total quality management; financial performance.
JEL Classification Code: O32; O35; G32.

1. INTRODUCTION

Science and technology that are developing rapidly in the current era of the industrial revolution (Faraji et al., 2022). There have been many innovations that have helped increase the competitiveness of companies in various industries (Jensen, 2021; Sanchez-Henriquez & Pavez, 2021). The company that is synonymous with the application of science and technology is the manufacturing industry (Jordão & Novas, 2017; Krmela et al., 2022; Kumar et al., 2021). Manufacturing companies in Indonesia have been accustomed to the use of technology in their production activities so far, because technology really helps the company's production to be more effective (Muchran, 2020; Rahardjo et al., 2019; Teja, 2017). However, there are still some manufacturing companies that still do not fully use technology in their production. This is due to maintaining the quality of similar products that are still the same as the old ones in that era until now (Latifah et al., 2021). In fact, changes in the industrial environment that are increasingly dynamic today and in the future will force all manufacturing companies to use technology as to support their production activities (Jensen, 2021; Khan et al., 2021; Regona et al., 2022a; Yeung, 2021). Innovation provides space for companies to seize new opportunities and improve company competitiveness (Jensen, 2021; Lestari et al., 2020; Rony Prabowo

et al., 2020). Companies that cannot to innovate impact on the abandonment of the company's products, a decline in the production cycle, and losing the company's position in the market environment (Jensen, 2021).

Innovation drives companies to discover and create new ideas, take risks, and encourage new business approaches (Agostini et al., 2017; Jensen, 2021; Rony Prabowo et al., 2020; Sanchez-Henriquez & Pavez, 2021). Management carries out resource exploration and exploitation activities in order to create innovations that are under with the needs of the market environment (Rodrigues et al., 2021). Companies are also required to produce quality products or services at low costs, improvise products with new attributes and produce products that differ from the previous ones from the innovation activities carried out (Jensen, 2021). Therefore, innovation is an important effort that must be carried out by every company in the modern era in order to win the competition, maintain sustainability, and improve company performance (Bayu et al., 2022; Kurniawati et al., 2022; Rounaghi, 2019; Tarigan et al., 2019).

Several researchers confirm the positive impact of innovation on firm performance (Kurniawati et al., 2022; Nemlioglu & Mallick, 2017; Valdez-Juárez et al., 2022; Yin & Sheng, 2019). Innovation is aimed at improving the company's performance in the long term (Yin & Sheng, 2019). The company's performance improvement is carried out by seeking a better market position through product and process innovation (Kurniawati et al., 2022). Product innovation creates a competitive advantage in the market through new products that are better than competitors, making it easier for companies to create market share and increase sales (Agustia, 2020; Dupire & M'Zali, 2018; Ratnawati, 2017; Sanchez-Henriquez & Pavez, 2021). New products and services resulting from the innovation process generate new market share, the ability to create prices, to encourage increased company profitability (Tarigan et al., 2019). Innovation is the key factor that affects the performance, long-term viability and sustainability of the organization (Haryati et al., 2021; Moskovich, 2020). However, research that focuses on the relationship between innovation and firm performance has not yielded conclusive results (Camison & Villar-López, 2014). Product innovation does not directly affect the company's performance. This finding raises the suspicion that the company must can develop market share related to the new product produced (Erkan et al., 2019; Yin & Sheng, 2019). There is a lack of models to track the effect of various types of innovations on firm performance over time, so future research is recommended to validate the findings of previous studies and present an integrative research framework that simultaneously covers the influence of innovation and firm performance (Agostini et al., 2017; Saunila, 2014). This research looks at this opportunity and examines the efficiency of innovation as an integrative framework for innovation. Efficiency is an important concept in innovation, because investing in innovation is not an activity that company management wants (Türkeş et al., 2021).

Innovation is based on how to create a quality product by optimizing all available resources, so that the company's efficiency can be increased. Innovation efficiency reduces unnecessary burdens to defend themselves in a competitive environment, so that the innovations carried out do not have a significant impact on the decline in company performance (Grabowska & Saniuk, 2022; Qiao & Fung, 2016; Zandi et al., 2019). Management's ability to properly calculate the efficiency of innovation can provide benefits to efforts to meet consumer preferences without placing an excessive burden on company resources (Adomah Worae & C. Ngwakwe, 2017).Innovation efficiency is defined as the company's ability to translate innovation inputs into innovation outputs (Türkeş et al., 2021).Although innovation is not a linear process of changing innovation inputs into innovation outputs, studying how the resources used as innovation inputs provide optimal output explain of the concept of innovation efficiency (Türkeş et al., 2021).

Some researchers empirically test the efficiency of innovation with different input and output choices (Belloc, 2012). His research estimates innovation efficiency by considering a firm's revenue, number of employees and R&D expenditures as inputs and total revenue, new hires and patents as innovation outputs. R&D, learning, manufacturing, marketing and organization as inputs to innovation and market share, sales growth, export rates, profit growth, productivity and new product rates as outputs of what he defines as technological innovation capability (Amin & Aslam, 2017; Business et al., 2013). They conclude that only 16% of firms are technically efficient. Innovation efficiency optimally combines of R&D employment as input and patent as innovation output (Amin & Aslam, 2017; Yin & Sheng, 2019). The research concluded the intensity of regional and inter-regional

collaboration that is close to the industry average characterizes the innovation efficient areas. Areas with very high or low intensity of collaboration, as well as imbalances between regions and between regions, are more often found among regions with innovation inefficiency.

Innovation that involves R&D for products and technology, causing innovation activities to require enormous costs (Mishra, 2017). This results in large cash disbursements during the innovation process and has a terrible impact on company performance. Innovation efficiency allocates innovation input optimally, so that the resulting output is greater than the innovation input (Jensen, 2021). The greater output generated from the innovation efficiency process results in large cash outlays that can be offset by much larger revenues. This causes the company's profitability to increase when innovation efficiency is carried out properly. Innovation efficiency also provides an opportunity for companies to improve their performance in the long term.

Corporate governance is needed to ensure effective planning and ensure risk management associated with investing in innovation (Yin & Sheng, 2019). Good corporate governance can design innovation effectively, so that efficiency can be built properly in the innovation process (Yin & Sheng, 2019). Ownership is the foundation of corporate governance because a company cannot exist without owners and share ownership rights are allocated to owners (Aguilera & Crespi-Cladera, 2016). Ownership contributes to value creation, builds a long-term company vision, and take a part in allocating company resources (Ma et al., 2022). Regarding innovation, ownership structure encourages management to increase innovation activities, especially concentrated ownership structure (Shehadeh et al., 2022). Innovation investments that involve high costs and high risks are a hard choice for companies with dispersed ownership structures (Khan et al., 2021). The dispersed ownership structure creates enormous differences in views between each owner so that it becomes an obstacle for companies to invest in innovation (Ma et al., 2022). In addition, companies with a concentrated ownership structure more easily absorb organizational culture that leads to innovation activities (Shehadeh et al., 2022).

Concentrated ownership encourages managers to increase innovation activities for the growth and sustainability of the company in the future (Ma et al., 2022). In addition, innovation activities are the efforts of the majority shareholders to manage their interests, namely increasing the prosperity of the owners. Innovation can be well received by managers if efficiency can be carried out in innovation activities (Jensen, 2021). Managers don't miss the opportunity to maximize non-corporate value that benefits their position and interests. The effectiveness of resource allocation when innovation efficiency is carried out results in lower innovation input costs than the resulting output. This causes the company's operational performance to increase in the short and long term (Latifah et al., 2021).

After this presentation (introduction), then part two of this research is presented the theoretical and empirical literature followed by the development of hypotheses. Part three, the determined method of data collection, sampling, and information construction. Section four provides the empirical results and their interpretation. Finally, section five summarizes the study with conclusions, policy implications, and future recommendations.

2. LITERATURE REVIEW

2.1. Agency Theory, Innovation Efficiency, and Ownership Concentration

Principal-agent problems usually arise in a firm's innovation activities (Hang et al., 2018). Innovation is very important to maintain a company's competitive advantage, but it requires a lot of time and investment of resources that contributes to the decline in the company's short-term operational performance (Ali & Anwar, 2021; Jordão & Novas, 2017). Managers will choose not to invest heavily in innovation activities and prefer steady performance improvements. Managers have an interest in increasing their wealth, so they have a tendency to reject innovation activities that require large financing (IMLM & IMN Jaya, 2020; Yin & Sheng, 2019). Managers will try their best to achieve short-term operational performance targets, because improving short-term operational performance provides benefits for increasing managers' income (IMLM & IMN Jaya, 2020). Manager's primary income comes from remuneration, where the remuneration received by managers depends on their short-term operational performance (Lusardi & Tufano, 2015). This often prompts managers to be wary of innovative projects with risks and uncertainties. This phenomenon also

encourages managers to intentionally reduce the company's cash expenditures for innovation activities in order to meet financial performance targets (IMLM & IMN Jaya, 2020).

Meanwhile, shareholders hope to increase their future earnings, so they seek to invest continuously in the company's innovation activities (Yuan et al., 2020). Shareholders have a long-term business orientation, so that innovation activities have the support of the largest shareholders (Ronny Prabowo & Setiawan, 2021; Yuan et al., 2020). Shareholders view that innovation makes it easier for companies to expand and differentiate market share, providing benefits for improving the company's long-term performance (Haddad et al., 2021). Companies with increasingly concentrated shareholdings will be more active in carrying out innovation activities. This is because concentrated shareholders will find it easier to provide funding injections for innovation activities to increase future performance growth (Jordão & Novas, 2017). Concentrated ownership seeks to use the network owned to reduce the uncertainty and high risk of innovation activities carried out by the company, so that innovation provides benefits according to shareholder expectations (Gamariel et al., 2022).

Certain efforts are needed to minimize agency problems between principals and agents when innovation is carried out by the company (Bandiyono, 2020). The innovations carried out must accommodate the interests of the principal and agent, so that innovation activities do not cause agency conflicts. Therefore, companies must consider the level of efficiency when innovation is carried out. Innovation efficiency gives managers the opportunity to increase their wealth, because the enormous cost of innovation can be offset by a much greater increase in revenue (Grabowska & Saniuk, 2022; Zandi et al., 2019). This results in the company's short-term performance being maintained and having the hope of increasing when innovation efficiency is carried out. Shareholders' expectations that managers increase innovation activities can be realized if the efficiency of innovation can be fulfilled properly (Zandi et al., 2019). This shows that innovation efficiency is a strategy to bridge the interests of principals and agents when the company has the intention of increasing innovation activities.

2.2. *Efficiency Innovation and Firm Performance*

The rapid advancement of technology, dynamic changes in demand, and increasingly fierce global competition have made it difficult for companies to maintain their competitive advantage (August, 2020). Therefore, companies must be more intensive in innovating as the major source to gain competitive advantage and be able to survive in a competitive environment (Rony Prabowo et al., 2020). Innovative companies are more flexible and more adaptable to the business environment, increasing opportunities better than competitors (Almulhim, 2020). Without continuous development and innovation, it will disrupt the company's internal conditions and impact on the imbalance between supply and demand in the market (Ruiter et al., 2022). In the modern era, investing in innovation projects makes it easy for companies to improve their short-term performance and produce cumulative effects in the long term (DC Chen & Chen, 2021).

However, innovation is expensive and carries a high risk because uncertainty revolves around the entire innovation process (Chatterjee & Bhattacharjee, 2020). Differences in demand for resources and adaptability to markets, changes in technology and knowledge, and environmental uncertainty will affect the distribution and use of operational costs, so that companies do not have a sense of security to carry out innovation projects (Regona et al., 2022b). This makes managers have no desire to carry out innovation projects to maintain the company's short-term performance growth (IMLM & IMN Jaya, 2020). This jeopardizes the prospects for the company's sustainability in the future, because an increasingly competitive environment requires companies to be more innovative in developing their products and production processes (August, 2020). Therefore, innovation must consider efficiency factors in order to reduce the excessive burden on the use of company resources (Grabowska & Saniuk, 2022). Innovation efficiency has an important role in an increasingly complex business environment where innovation efficiency can reduce unnecessary burdens to defend themselves in a competitive environment.so that the innovations carried out do not have a significant impact on improving the company's performance (Kafetzopouloset al., 2019).

Innovation comes from the company's desire to develop products that are differ from competitors, create new products according to consumer preferences, and shorten the production cycle (Tavassoli and Karlsson, 2015). Products and processes resulting from innovation activities create and develop market share, increasing sales volume. To achieve this, R&D is needed for customers, competitors, and company resources (Haryati et al., 2021). R&D causes the company's cash expenditure to increase, so

efficiency is needed so as not to disrupt the company's cash flow. The efficiency of innovation optimally combines of using innovation inputs to produce greater output (Zandi et al., 2019). Innovation efficiency makes it easy for companies to expand their market share without placing an enormous burden on the company's operational activities, so that companies have the convenience of increasing sales volume, as well as improving performance (DC Chen & Chen, 2021). In addition, new products resulting from innovation activities make the company a market leader, so that it is easy to determine prices for these new products (De et al., 2020). This resulted in the company's revenue increasing from the addition of market share and the ability to shape prices. This shows that innovation efficiency is a strategy to improve company performance while remaining actively involved in the competitive environment (Qiao & Fung, 2016; Yan et al., 2019). Therefore, this study plans the hypothesis that:

H1: Innovation efficiency has a positive effect on company performance

2.3. *Moderation Effect Ownership Concentration in The Relationship Innovation Efficiency on Firm Performance*

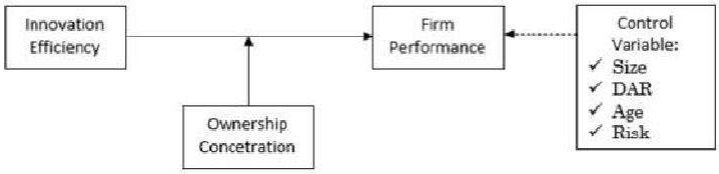
Ownership structure has a major influence on the innovation activity of the company (Saona et al., 2020). Companies with a concentrated ownership structure encourage managers to be more active in exploring forms of innovation that the company can develop (Mustafa et al., 2020; Qiao & Fung, 2016). Concentrated ownership provides an injection of funding to finance investments in innovation to meet its expectations for future growth in the company's performance and increasing their prosperity (Gamariel et al., 2022). However, company managers have a tendency to be less aggressive in financing innovation activities (Logachev et al., 2021). The high cost of investing in innovation creates a reluctance for managers to seek to increase innovation activity (Qiao & Fung, 2016). The large investment costs create the possibility for managers to get a smaller return from the performance they have done (Jensen, 2021). Agency problems that arise between principals and agents when innovating must be minimized as best as possible, so that companies can survive in a competitive environment and obtain better sustainability in the future (Mishra, 2017; Yin & Sheng, 2019).

Active involvement of shareholders in the management process to influence managers' innovative efforts is a form of effort to resolve problems that arise among actors in innovation activities (Danso et al., 2019; Tarigan et al., 2019; Xie et al., 2019). Shareholders can use their ownership position to actively influence operations or management when they are not satisfied with the implementation of the innovation strategy (Dilla et al., 2019). Shareholders help improve the risk-taking process by managers, so managers are motivated to increase the company's innovation activities (Eroglu & Sanders, 2021). Shareholders have the expectation that their profits will increase if they can influence the actions of managers to innovate (Xie et al., 2019). Companies with concentrated ownership will be more aggressive in increasing innovation due to the active involvement of shareholders in the management process (Shehadeh et al., 2022). Shareholders seek to encourage managers to support their initiatives to create innovations in business processes through efforts to increase innovation activities (Jensen, 2021).

Companies with a concentrated ownership structure encourage management to increase the company's innovation activities by considering cost efficiency when innovation is carried out (Gamariel et al., 2022; Ma et al., 2022). Innovation efficiency increases when the company's ownership structure is more concentrated due to the active involvement of shareholders in the management process (Yuan et al., 2020). Concentrated ownership roles to be actively involved in innovation activities provide tighter supervision to managers, so managers are more motivated to innovate and maintain cost efficiency (Yuan et al., 2020). The cost efficiency created during the innovation process has an impact on increasing market share, increasing sales volume, and minimizing operational costs (Exposito & Sanchis-Llopis, 2018). This makes it easy for company managers to improve company performance (Muthuveloo et al., 2017). In addition, concentrated ownership encourages company management to carry out innovation efficiency in order to minimize the current use of cash, so that cash disbursements can be maintained (Gamariel et al., 2022). This gives hope to managers to keep getting higher returns when innovation activity increases. Therefore, this study formulates the hypothesis that:

H2: Concentrated ownership increases the effect of innovation efficiency on company performance

Figure 1. Conceptual Framework



3. Research Methodology

This research method uses quantitative methods. The data used in this study is secondary data. The population of this study are manufacturing companies listed on the Indonesia Stock Exchange. The sample was selected using purposive sampling method, using certain criteria. The criteria determined by the researcher are manufacturing companies that present the data needed in the study. The selected research period is 2013 to 2019.The amount of data used is not the same every year, because there are additional companies that carry out Initial Public Offering (IPO), delisting, and do not present research data every year. The sample used for analysis in this study was 616 data on manufacturing companies in Indonesia.

Table 3.1. Definition and measurement of research variables

No.	Variable	Indicators/measurements	Scale
1.	Firm performance, pThe measurement of the company's performance in question is only those that are directly related to innovation, which is difficult to determine (Wang & Wang, 2012).	$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$	Ratio
2.	Innovation Efficiency, provides a basic explanation of how the use of resources as input for innovation provides optimal results (Qiao & Fung, 2016).	Innovation efficiency is obtained by operationalizing the input and output of innovation in the non-parametric mathematical method of Data Envelopment Analysis (DEA). To estimate the efficiency of innovation by using 3 inputs, namely: research and development expenses, engine repair expenses, and technology purchases and 1 output (Cruz-Cázares et al., 2013; Erkan et al., 2019; Qiao & Fung, 2016). $hs = \frac{\sum_{j=1}^{m} Ui.Yis}{\sum_{j=1}^{n} Vj.Xjs}$	Ratio
3.	Ownership Concentration has an important function in innovation projects (Belloc, 2012).Ownership concentration used in this study is concentrated ownership, becauseThe dispersed ownership structure creates large differences in views between each owner so that it becomes an obstacle for companies to invest in innovation.	Ownership concentration is calculated based on the hi-difference of the controlling shareholder (Castanheira et al., 2010; Sartawi et al., 2014; Shehadeh et al., 2022). This study uses the 3 largest controlling shareholders, so thatownership concentration is formulated: **OC = (Equity1 – Equity2)2 + (Equity2 – Equity3)2**	Ratio
4.	Size Firm (control), used to estimate company size because companies with large assets have the opportunity to explore and exploit innovation activities. Therefore, companies with large assets have a high opportunity to increase innovation projects and make projects efficient (Cruz-Cázares et al., 2013).	*Ln total assets* (proxied by total assets)	Ratio
5.	Capital structure (control), is used to measure capital structure because companies with large capital structures	$\textit{Debt to Equity} = \frac{\textit{Total Liabilities}}{\textit{Total Equity}} \times 100\%$	Ratio

	have the possibility to fund innovation activities (Lin, 2017).		
6.	Firm age (control). The age of the company indicates the maturity of the company in a competitive environment, where companies with a large age have more experience in business operations, making it easier to win the competition (Cruz-Cázares et al., 2013).	Calculated from the year of establishment to the present	Nominal
7.	Firm risk (control) shows the consequences of actions taken by company managers. Innovation is an activity that has a large risk, so the risk that the company currently has is a consideration for innovation efficiency in order to improve company performance.	Company risk is calculated using the standard deviation of EBITDA (Earning Before Interest, Tax, Depreciaton, and Amortization) divided by the company's total assets. The formula for the standard deviation of EBITDA is as follows: $CR = \sqrt{\frac{n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_1)^2}{n\,(n-1)}}$ Where n is the number of data and1 is EBITDA. So the formula for calculating company risk is: **Risk = EBITDA Standard Deviation / Total Assets**The greater the company's risk indicates that the company's executives are risk taking, the smaller the company's risk indicates that the company's executives are risk averse	Ratio

Source: Data tabulation, 2022.

This study conducted data analysis and statistical testing using SPSS 24.0 to analyze descriptive statistics, correlation analysis, multiple linear regression and moderated regression analysis. Multiple linear regression was used to test hypothesis 1, while moderated regression analysis was used to test hypothesis 2. The model developed to measure the effect of innovation efficiency on company performance (hypothesis 1) was as follows:

ROA = 0 + 1EFF + 2SIZE + 3DER + 4AGE + 5RISK +

While the model developed to measure ownership concentration moderation on the effect of innovation efficiency on company performance (hypothesis 2) is as follows:

ROA = 0 + 1EFF + 2OC + 3EFF*OC + 4 SIZE + 3DER + 4AGE + 5RISK +

Information:

ROA	: Financial Performance
EFF	: Innovation efficiency
OC	: Ownershipconcentration
SIZE	: Size firm
DAR	: Capital structure
AGE	: Firm age
RISK	:Firm risk

4. Results and Discussions

4.1. *Descriptive Statistics*

The descriptive statistics used include: minimum, maximum, average, and standard deviation values for company performance, innovation efficiency, ownership concentration, and control variables. In addition, this section presents a chart of the innovation efficiency per year of manufacturing companies for the period 2013 to 2019. In Table 1 provides information on the number of companies that carry out product innovation efficiency during the period 2013 to 2019.

Table 1.
Manufacturing companies that carry out product efficiency for the period 2013-2019

Year	Number of Companies	Number of Efficient Companies	%
2013	86	2	2.33
2014	90	2	2.22
2015	89	2	2.25
2016	81	2	2.47
2017	85	3	3.52
2018	94	3	3.19
2019	91	3	3.29

Source: research data, 2019.

The results of table 1 show that the efficiency of innovation is still minimal by manufacturing companies in Indonesia. This indicates that manufacturing companies in Indonesia have not been able to optimize the use of their resources for innovation activities.

Table 2 provides descriptive statistical results of the variables in this study. Here are the results of the test data.

Table 2. Descriptive statistics

	N	Minimum	Maximum	mean	Std. Deviation
ROA	616	-0.401425	4.446758	0.044370	0.084450
EFF	616	0	1	0.044126	0.175878
OC	616	0.000000	0.992813	0.282687	0.2893058
DER	616	1,267	23.201	9.0281	11.2034
SIZE	616	10,392	24,918	22.9281	25,9291
AGE	616	5	7	3.4029	5,7261
RISK	616	-1.750198	2,64381	0.115318	0.547381
Valid N (listwise)					

Source: research data, 2019.

From a sample of 616 manufacturing company data for the period 2013 to 2019, the company's performance shows a range of values of -0.401425 to 4.446758 with an average of 0.044370 and a standard deviation of 0.084450. This shows that the sampled companies have different abilities in improving their performance. Innovation efficiency shows that it has a value range of 0 to 1 with an average of 0,044126and standard deviation 0,175878. These results indicate that there are still companies that have not been able to carry out innovation efficiency, and companies that have the ability to carry out innovation efficiency are still very low. Ownership concentration shows a range of values from 0 to 0,992813with an average of 0,282687and standard deviation 0,2893058. These results indicate that in general manufacturing companies in Indonesia have a concentrated ownership structure, but there are companies that have scattered shareholdings. The average debt to equity ratio obtained is 9.0281 and the standard deviation is 11.2034. While the minimum value is 1,267 and the maximum is 23,201. This result means that manufacturing companies in Indonesia that have a higher Debt to Equity Ratio value, the higher the amount of debt that must be paid off by the company within a certain period of time. The firm risk value that has been tested produces a minimum value of-1.750198 and the maximum value is 2.64381. Meanwhile, the average value is 0.115318 and the standard deviation value is 0.547381. This result means that sthe higher the risk of a company which includes a high risk of uncertainty demand, then this poses a risk The company's income is uncertain. Where with the uncertainty of the company's income, this causes the company's profitability to decrease.

4.2. *Correlational Analysis*

Correlation analysis was conducted to detect autocorrelation between company performance and innovation efficiency, ownership concentration, and overall control variables. In addition, correlation analysis was used to examine the problem of multicollinearity between the independent variables. The test results are described in Table 3 below.

Table 3. Correlational analysis of variables

	ROA	EFF	OC	DER	SIZE	AGE	RISK
ROA	1						
EFF	0.080	1					
OC	0.131	0.063	1				
DER	0.311	0.077	0.054	1			
SIZE					1		
AGE	0.257	0.158	0.545	0.219		1	
RISK							1

* p 0.1; ** p 0.05; *** p 0.01

The results from Table 3 show a weak positive correlation between firm performance and innovation efficiency ($r = 0.099$, $p < 0.05$), ownership concentration ($r = 0.084$, $p < 0.05$), firm size ($r = 0.152$, $p < 0.01$), firm age ($r = 0.256$, $p < 0.01$), and firm risk ($r = 0.140$, $p < 0.01$). Meanwhile, capital structure has a negative correlation with firm performance ($r = -0.276$, $p < 0.01$). In addition, the results of the analysis also show that there is no multicollinearity problem between independent variables because it does not exceed 0.80 or 0.90. Multicollinearity is most likely to occur if the correlation coefficient is 0.80 and above (IMLM Jaya, 2020). The results showed that there was no multicollinearity because the correlations between the independent variables were all below the threshold value of 0.8. Thus, the results of the Pearson correlation coefficient confirm that there is no multicollinearity problem.

4.3. *Regression Analysis*

In this study, three stages of analysis were carried out to answer research problems and to answer research objectives. The first stage is to examine the effect of innovation efficiency and control variables together on company performance. This stage uses multiple linear regression analysis and is carried out to answer the first hypothesis. The second stage is to enter the moderating variable ownership concentration in the model that has been built in the first stage. This stage uses multiple linear regression analysis. The last stage is to include the interaction between innovation efficiency and ownership concentration in the model built in stage two. This stage uses multiple linear regression analysis and is carried out to answer the first hypothesis.

Table 4. Hypothesis testing

Variable	Model 1		Model 2		Model 3	
	Coef	Sig	Coef	Sig	Coef	Sig
Constant	-1,247***	0.000	-1,212***	0.000	-0.994***	0.003
OC	0.277***	0.001	0.276***	0.001	-0.231	0.374
EFF	0.124***	0.000	-0.021	0.861	-0.287	0.104
ROA	0.213***	0.001	-0.005***	0.000	1,234**	0.040
SIZE	0.482***	0.000	0.483***	0.000	0.487***	0.000
DAR	0.046***	0.000	0.045***	0.000	0.041***	0.000
AGE	0.910***	0.000	-0.032***	0.001	0.095***	0.000
RISK	0.230***	0.001	-0.098***	0.000	0.034***	0.000
EFF*OC	0.402***	0.000	-0.192***	0.000	0.087***	0.000
*Significant at p-value < 0.1; ** Significant at p-value < 0.05; ***Significant at p-value < 0.01						

The results from table 4 show that company size, age, and company risk have a positive and significant effect on company performance. In addition, the capital structure has a negative and

significant effect on the company's performance. The first hypothesis states that there is a positive effect of innovation efficiency on company performance. The results of the research on model 1 show that innovation efficiency has a positive and significant effect on company performance with a Beta (ß) value of 0.041 and p-value = 0.021. This result means that the higher the efficiency of innovation by the company, the higher its performance will be. Companies with a high level of efficiency when carrying out innovation projects have the advantage of improving their short-term performance (Peñarroya-Farell & Miralles, 2022). The innovations made provide a better opportunity to become market leaders, so they are able to determine the price level for the new products they create (MA Chen et al., 2019). The amount of costs incurred by the company to fund innovation projects can be minimized by managers when efficiency is carried out properly. Managers will choose the optimal use of resources, so that the resulting innovation is in accordance with market needs.

Based on the existing phenomenon, innovation efficiency makes it easy for companies to increase sales volume, increase sales growth, increase net profit, and minimize investment costs for innovation (Qiao & Fung, 2016). This shows that innovation efficiency is a form of strategy that companies can develop to improve their performance (short or long term) and maintain their sustainability. The findings of this study are in line with previous researchers who stated that innovation efficiency is a form of strategy to improve company performance by remaining actively involved in the competitive environment and there are several spaces that companies can develop to improve their innovation efficiency (De et al., 2020; Qiao & Fung, 2016; Trinugroho et al., 2022).

The results of the research on model 2 show that the interaction of innovation efficiency with ownership concentration has a positive and significant effect on company performance with a Beta value of 0.151 and p-value = 0.002. The results of this study mean that the more concentrated shareholder ownership, this will encourage managers to be more active in making efficiency in innovation projects, so that it has an impact on increasing company performance. Concentrated ownership also encourages management to increase innovation projects to improve the company's position in the competitive environment. Concentrated ownership expects the company to be able to maintain a competitive advantage and increase the company's competitiveness with the company's innovations. The drive for concentrated ownership of managers is manifested by the direct involvement of shareholders in innovation projects. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated ownership expects that innovation projects run by managers do not require large injections of funding,

so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers (Saona et al., 2020; Shehadeh et al., 2022). The direct involvement of concentrated ownership in innovation projects provides opportunities for companies to maintain competitive advantage and improve company performance. The findings of this study are in line with previous findings which state that concentrated ownership has an important role in innovation projects, so that it makes it easier for companies to improve their performance (Chatterjee & Bhattacharjee, 2020).

5. Conclusion

The purpose of this study is to examine the effect and relationship between innovation efficiency on company performance, and examine the moderating role of ownership concentration on the effect of innovation efficiency on company performance. By using a sample of the annual reports of 616 manufacturing companies listed on the Indonesia Stock Exchange from 2013 to 2019, it is found that innovation efficiency affects company performance and concentrated ownership, and encourages managers to improve innovation efficiency which has an impact on improving company performance. However, this study finds the fact that manufacturing companies in Indonesia are still lacking in innovation efficiency, so they have vulnerabilities in facing global competition.

Indonesia has a goal to become one of the developed countries in the world economy. Therefore, it is important for every company in Indonesia to continuously develop innovations in their products or production processes to support these goals. Innovation is a strategy for every company in Indonesia to be able to compete with the global competitive environment. Therefore, the innovative strategy undertaken, it is necessary to consider efficiency in the project financing process. Innovation efficiency provides an opportunity for each company to develop its business processes without placing great pressure on company resources (Grabowska & Saniuk, 2022; Jensen, 2021). In Indonesia, the corporate ownership structure is dominated by concentrated ownership. This condition makes it easier for each company to carry out innovation projects and make efficiencies due to the strong encouragement of the company owners. Concentrated ownership can encourage managers to improve the company's innovation projects to maintain performance growth, maintain competitive advantage, and maintain company viability (Shehadeh et al., 2022).

The limitation of this research is that this finding has not technically explained the steps that need to be taken by entrepreneurs to carry out the efficiency of product innovation they produce. Thus, this limitation can be covered by the existence of further research in the future that will examine the strategic steps that need to be taken by entrepreneurs to carry out product innovation efficiency, so that their business performance can continue to develop and be competitive and have a competitive advantage in the future. This finding provides a signal for several stakeholders to start controlling the innovation work carried out by the company's management, the aim is to form budget efficiency and the effectiveness of innovation products in the future. like Indonesia,

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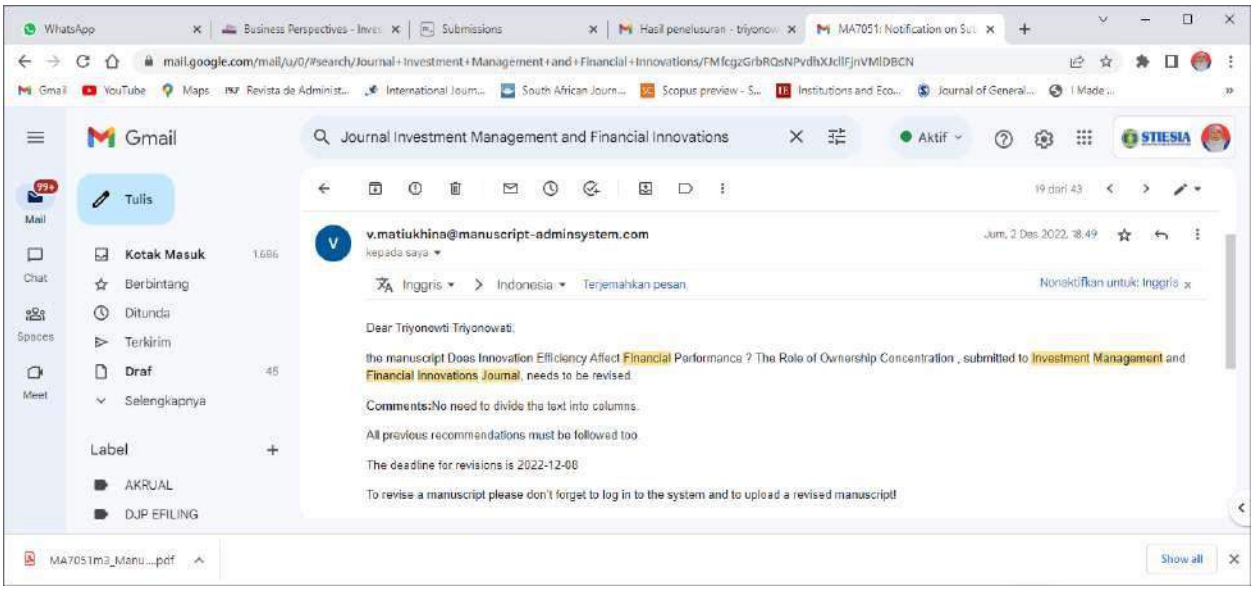

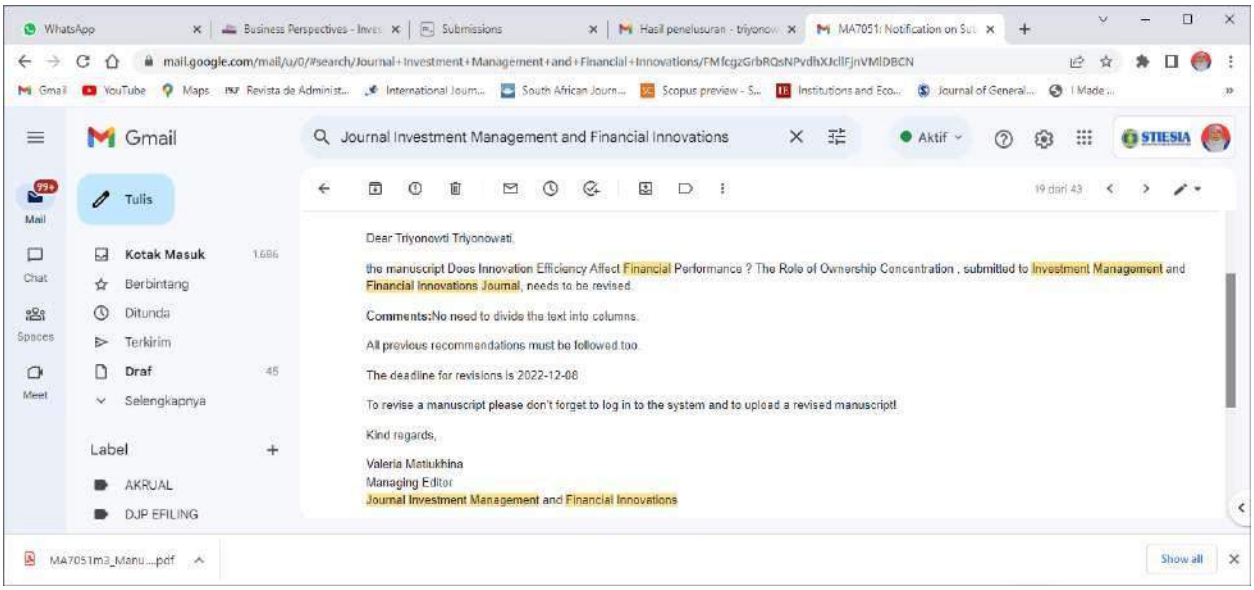

Dear Triyonowti Triyonowati,

the manuscript Does Innovation Efficiency Affect Financial Performance ? The Role of Ownership Concentration , submitted
to Investment Management and Financial Innovations Journal, needs to be revised.

Comments: No need to divide the text into columns.

All previous recommendations must be followed too.

Keterangan: Bukti item 3.5.(Hal 74-75)

The deadline for revisions is 2022-12-08

To revise a manuscript please don't forget to log in to the system and to upload a revised manuscript!

Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations

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Revised has been fixed by reduce divide column

3. RESULTS

In Table 1 provides information on the number of companies that carry out product innovation efficiency during the period 2013 to 2019.

Table 1. Manufacturing companies that carry out product efficiency for the period 2013-2019

Year	Number of Companies	Number of Efficient Companies	%
2013	86	2	2.33
2014	90	2	2.22
2015	89	2	2.25
2016	81	2	2.47
2017	85	3	3.52
2018	94	3	3.19
2019	91	3	3.29

Source: research data, 2019.

The results of table 1 show that the efficiency of innovation is still minimal by manufacturing companies in Indonesia. This indicates that manufacturing companies in Indonesia have not been able to optimize the use of their resources for innovation activities.

Table 2 provides descriptive statistical results of the variables in this study. Here are the results of the test data.

Table 2. Descriptive statistics

	N	Minimum	Maximum	mean	Std. Deviation
ROA	616	-0.401425	4.446758	0.044370	0.084450
EFF	616	0	1	0.044126	0.175878
OC	616	0.000000	0.992813	0.282687	0.2893058
DER	616	1,267	23.201	9.0281	11.2034
SIZE	616	10,392	24,918	22.9281	25,9291
AGE	616	5	7	3.4029	5,7261
RISK	616	-1.750198	2,64381	0.115318	0.547381
Valid N (listwise)					

Source: research data, 2019.

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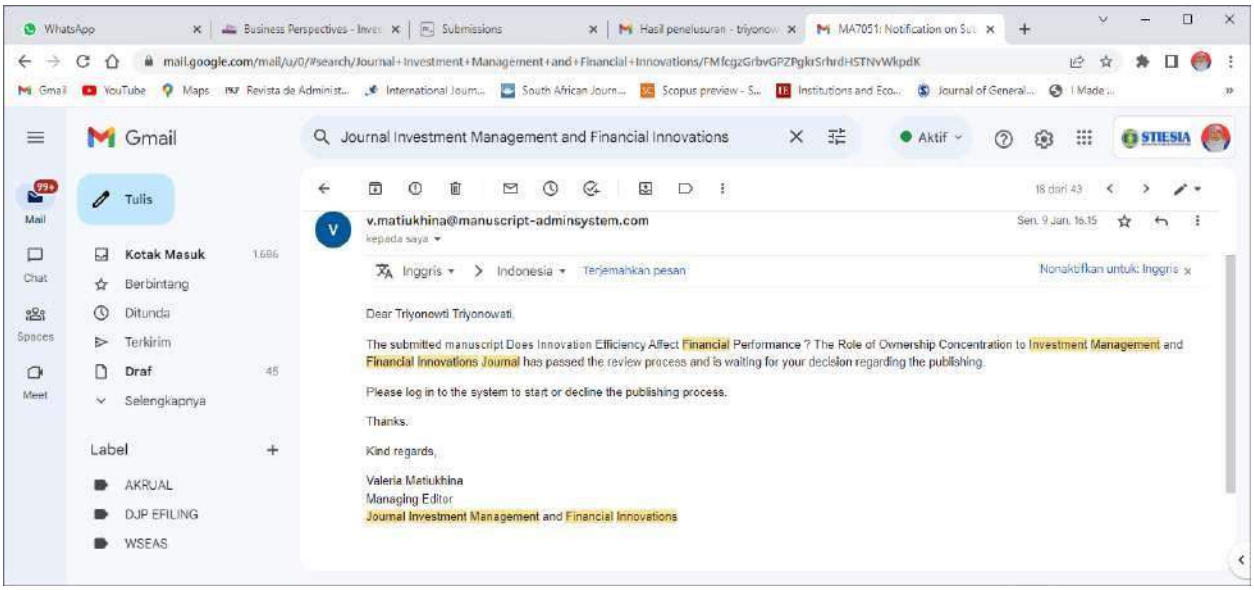
Bukti revisi item 3.5 dengan menghilangkan pembagian kolom pada tabel hasil penelitian

The review process has passed



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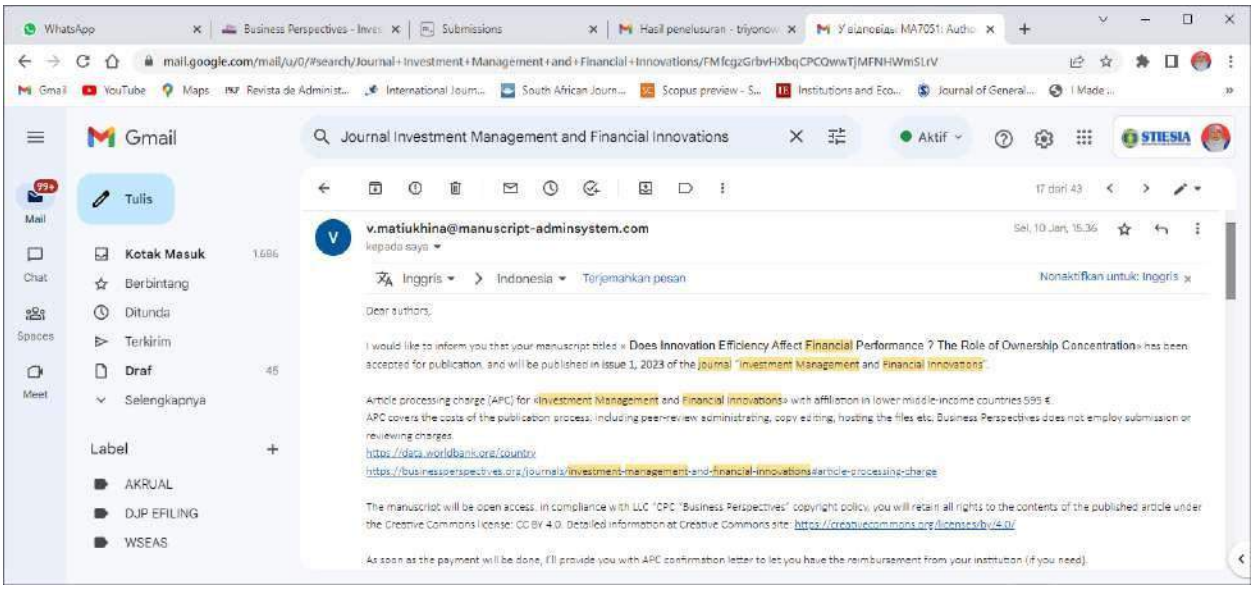

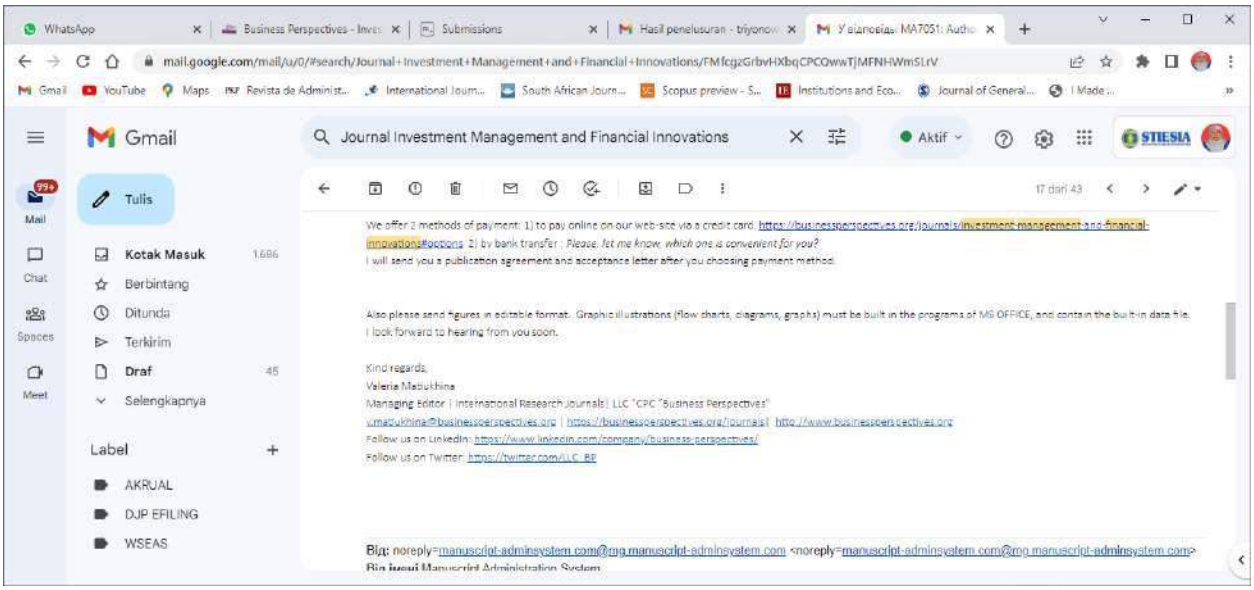

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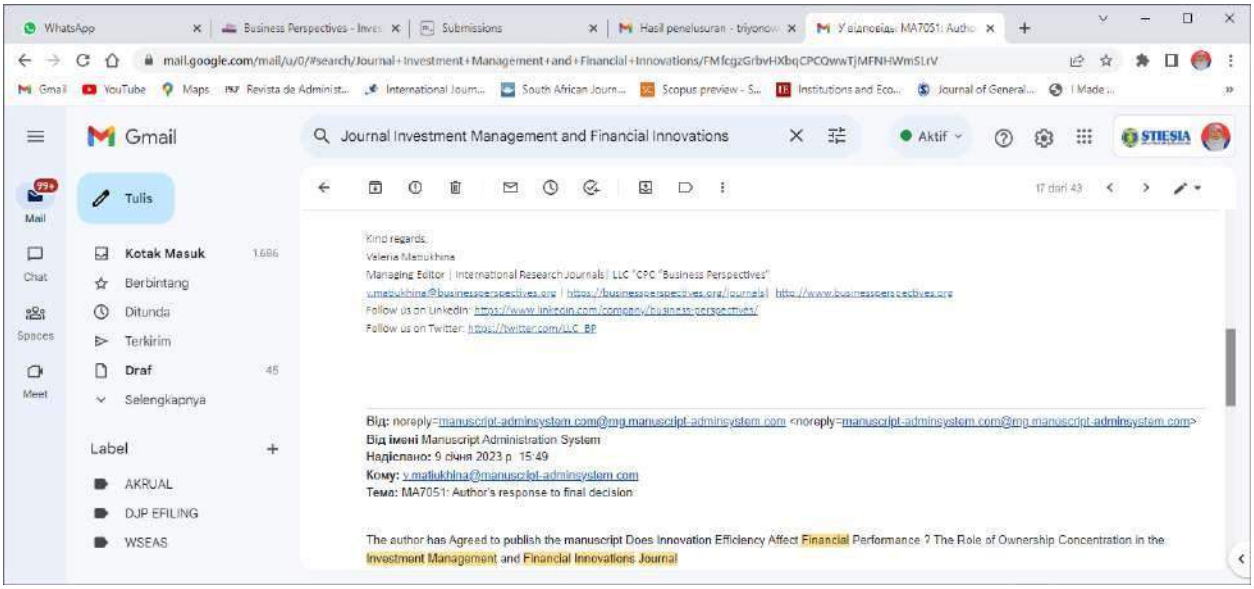

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10th of January, 2023

Triyonowati
Department Management
Sekolah Tinggi Ilmu Ekonomi Indonesia (STIESIA) Surabaya
Indonesia

ACCEPTANCE LETTER

Dear Triyonowati,

We are pleased to inform you that your manuscript « DOES INNOVATION EFFICIENCY AFFECT FINANCIAL PERFORMANCE ?THE ROLE OF OWNERSHIP CONCENTRATION" co -authored with Rizki Amalia Elfita, Suwitho, Titik Mildawati, has been double blind peer-reviewed and accepted for publication in the international journal "Investment Management and Financial Innovations", which is scheduled to be published in Volume 20 Issue 1, 2023.

With cordial regards,
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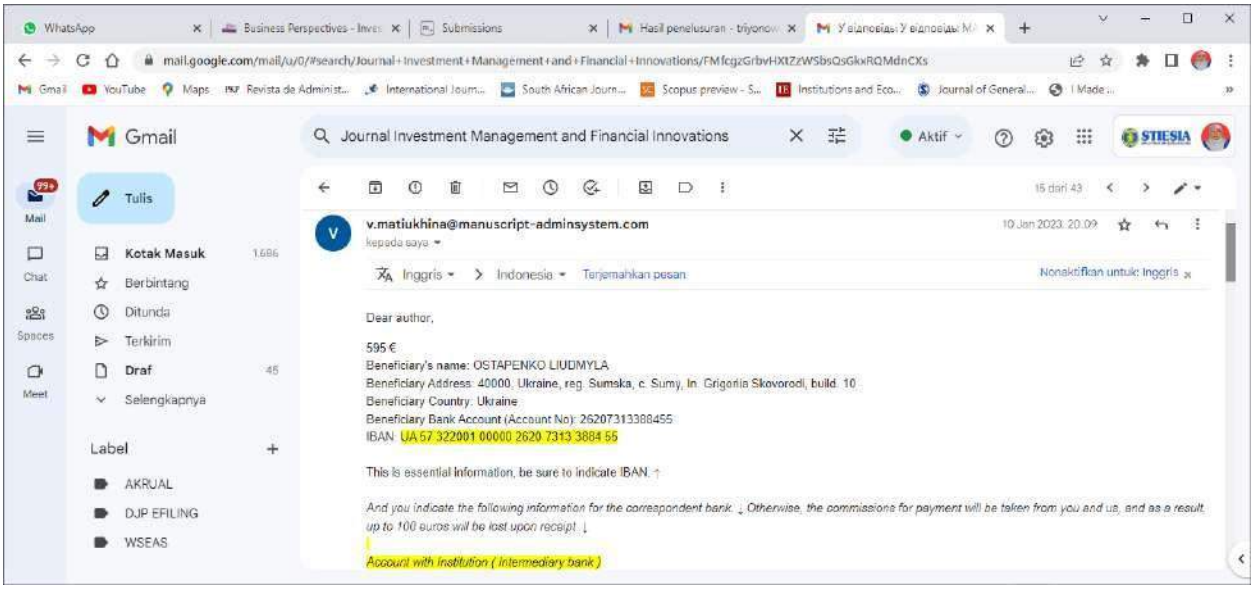

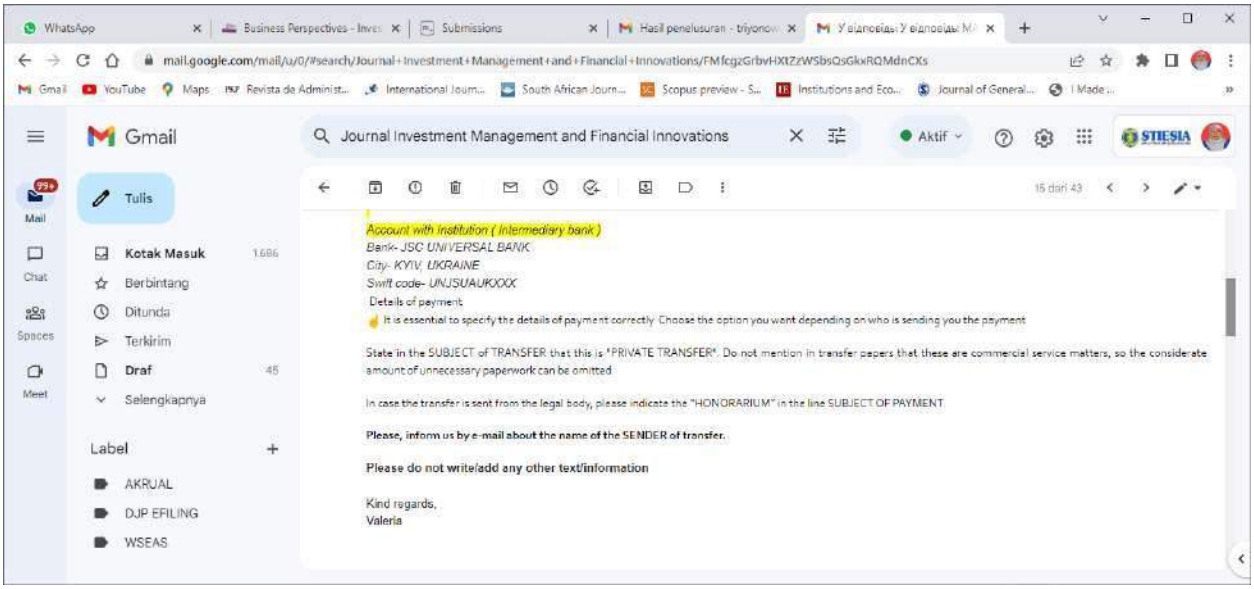

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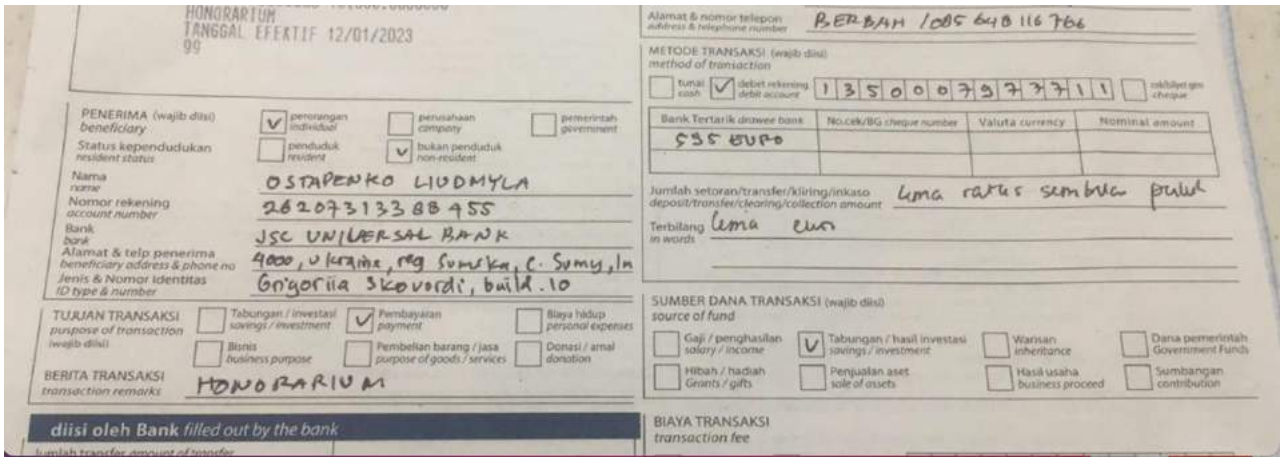
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tunai / cash ☐ debet rekening / debit account ☑ 1 3 5 0 0 0 7 9 7 3 7 1 1 cek/bilyet giro / cheque ☐

PENERIMA (wajib diisi) / beneficiary
Status kependudukan / resident status: perorangan / individual ☑ perusahaan / company ☐ pemerintah / government ☐; penduduk / resident ☐ bukan penduduk / non-resident ☑
Nama / name: OSTAPENKO LIUDMYLA
Nomor rekening / account number: 26207313388455
Bank: JSC UNIVERSAL BANK
Alamat & telp penerima / beneficiary address & phone no: 4000, Ukraine, reg Sumska, C. Sumy, In
Jenis & Nomor Identitas / ID type & number: Grigoriia Skovordi, build.10

Bank Tertarik di/wee bank	No.cek/BG cheque number	Valuta currency	Nominal amount
SSS BUPO			

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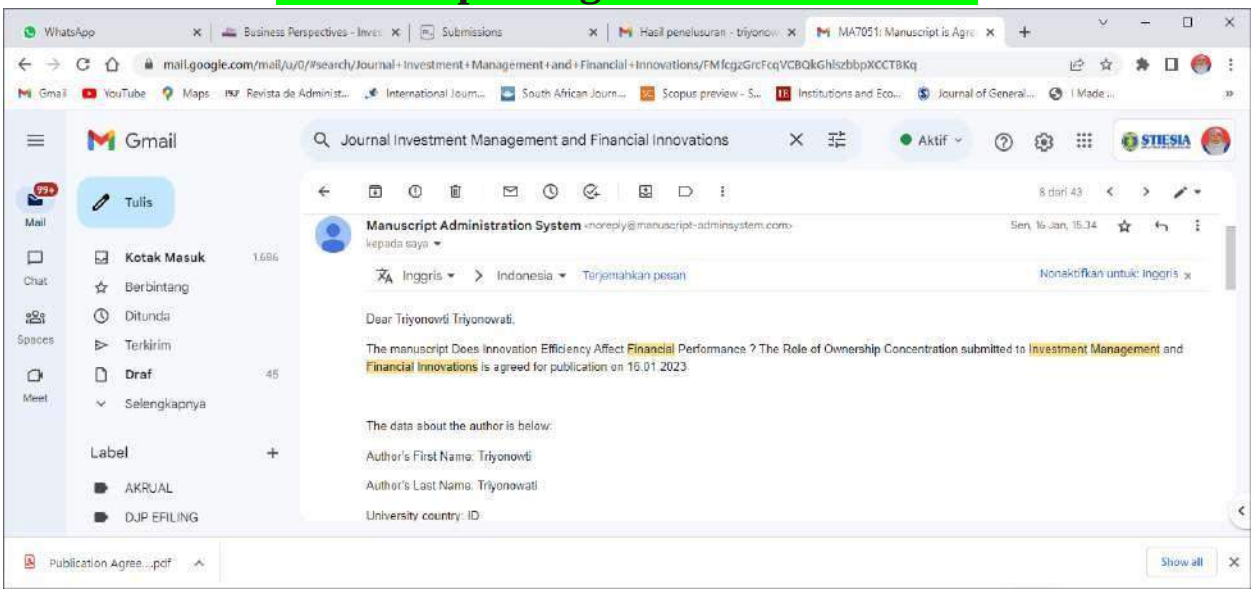

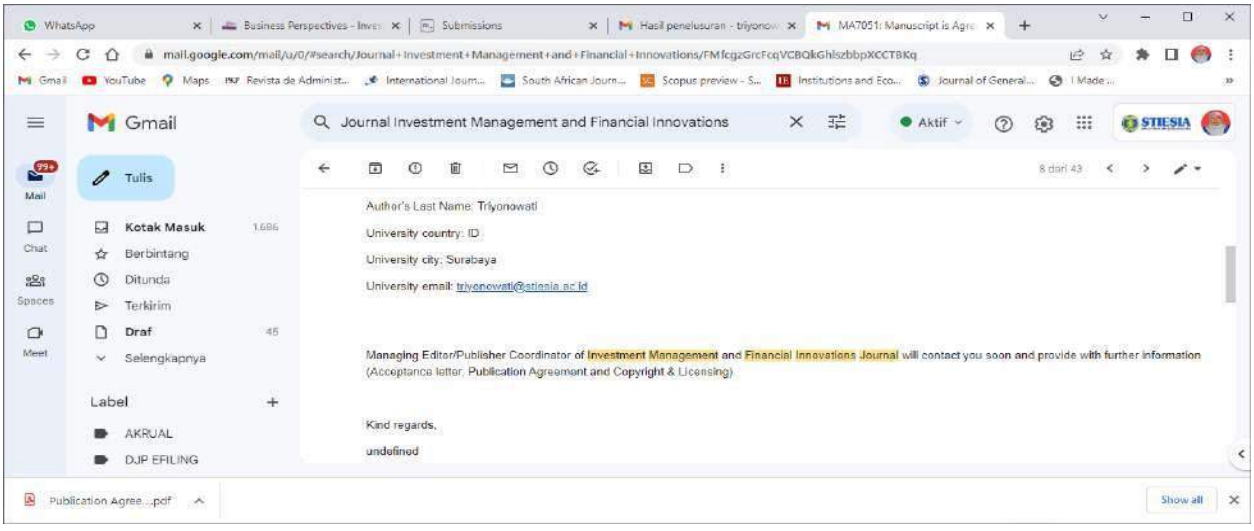

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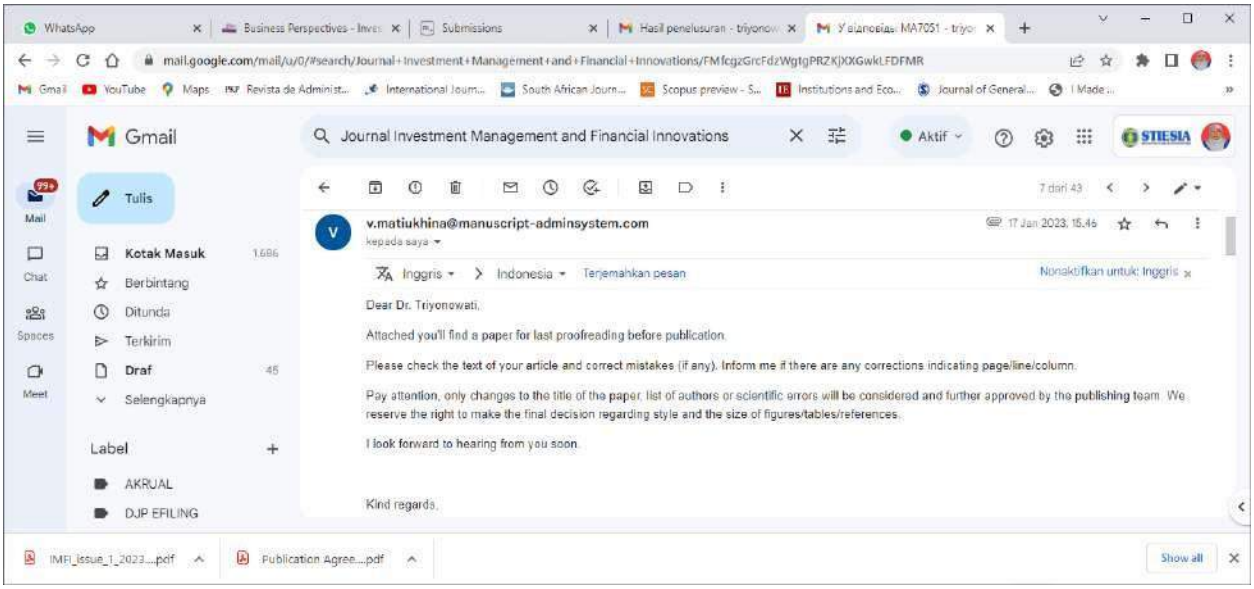

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Suwitho (Indonesia), **Titik Mildawati** (Indonesia)

DOES INNOVATION EFFICIENCY AFFECT FINANCIAL PERFORMANCE? THE ROLE OF OWNERSHIP CONCENTRATION

Abstract

The company that is synonymous with the application of science and technology is the manufacturing industry (Krmela et al., 2022). Manufacturing companies in Indonesia have been accustomed to the use of technology in their production activities so far, because technology really helps the company's production to be more effective (Muchran, 2020). This study examines the effect of innovation efficiency on firm performance and the moderating role of ownership concentration on this effect. This study examines innovation efficiency as the optimal combination of innovation input and innovation output. The inputs used are research and development expenses, machine repair ex- penses, and information technology purchases. Meanwhile, the output of innovation. This study used 616 annual reports of manufacturing companies from 2013 to 2018. The analytical technique used is a moderated regression analysis. The results show that efficiency is positively and significantly correlated with company performance. In ad- dition, the results of the study provide evidence of concentrated ownership, encour- aging managers to be more intensive in carrying out innovation efficiency so that it affects increasing company performance. These findings show that there is efficiency in innovation projects that can improve company performance, and companies with concentrated ownership find it easier to carry out innovation efficiency because of the active involvement of shareholders in the management process when innovation proj- ects are implemented aimed at improving company performance.

Keywords industry management, firm strategy, market performance, corporate financial management, sustainable development financing

JEL Classification F63, L16, M11, M21, O11

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INTRODUCTION

Changes in the manufacturing environment today are becoming more dynamic and, in the future, will force all manufacturing companies to use technology to support their manufacturing activities. (Yeung, 2021). Innovation provides space for companies to seize new oppor- tunities and improve company competitiveness (Lestari et al., 2020). Companies that fail to innovate affect the rejection of the company's products, the reduction of the production cycle and the loss of the company's position in the market environment (Jensen, 2021).

Innovation drives companies to discover and create new ideas, take risks, and encourage new business approaches (Sanchez-Henriquez & Pavez, 2021). Companies are also required to produce quality products or services at low costs, improvise products with new attributes and produce products that differ from the previous ones from the inno- vation activities carried out (Jensen, 2021). Therefore, innovation is an important effort that must be carried out by every company in the modern era in order to win the competition, maintain sustainabili-

ty, and improve company performance. Innovation efficiency reduces unnecessary burdens to defend themselves in a competitive environment, so that the innovations carried out do not have a significant impact on the decline in company performance (Grabowska & Saniuk, 2022). Management's ability to properly calculate the efficiency of innovation can provide benefits to efforts to meet consumer preferences without placing an excessive burden on company resources (Adomah Worae & Ngwakwe, 2017). Innovation efficiency is defined as a company's ability to translate innovation inputs into innovation outputs (Türkeş et al., 2021). Although innovation is not a linear process of changing innovation inputs into innovation outputs, the study how the resources used as innovation inputs provide optimal output explains the concept of innovation efficiency (Türkeş et al., 2021).

Good corporate governance can design innovation effectively, so that efficiency can be built properly in the innovation process (Yin & Sheng, 2019). Ownership is the foundation of corporate governance because a company cannot exist without owners, and share ownership rights are allocated to owners (Aguilera & Crespi-Cladera, 2016). Ownership contributes to value creation, builds a long-term company vision, and takes a part in allocating company resources (Ma et al., 2022). Regarding innovation, ownership structure encourages management to increase innovation activities, especially concentrated ownership structure (Shehadeh et al., 2022). Innovation investments that involve high costs and high risks are a hard choice for companies with dispersed ownership structures (Khan et al., 2021). The dis- persed ownership structure creates enormous differences in views between each owner so that it be- comes an obstacle for companies to invest in innovation (Ma et al., 2022). In addition, companies with a concentrated ownership structure more easily absorb organizational culture that leads to innovation activities (Shehadeh et al., 2022).

Concentrated ownership encourages managers to increase innovation activities for the growth and sustainability of a company in the future (Ma et al., 2022). Innovation can be well received by managers if efficiency can be carried out in innovation activities (Jensen, 2021). Managers do not miss the opportunity to maximize non-corporate value that benefits their position and interests. The effectiveness of resource allocation when innovation efficiency is carried out results in lower innovation input costs than the resulting output. Innovation is aimed at improving a company's performance in the long term (Yin & Sheng, 2019). A company's performance improvement is carried out by seeking a better market position through product and process innovation (Kurniawati et al., 2022). New products and services resulting from the innovation process generate new market share, the ability to create prices, to encourage increased company profitability (Tarigan et al., 2019).

There is a lack of models to track the effect of various types of innovations on firm performance over time, so future research is recommended to validate the findings of previous studies and present an integrative research framework that simultaneously covers the influence of innovation and firm per- formance (Agostini et al., 2017). This study looks at this opportunity and examines the efficiency of in- novation as an integrative framework for innovation. Efficiency is an important concept in innovation, because investing in innovation is not an activity that company management wants (Türkeş et al., 2021).

1. LITERATURE REVIEW

Principal-agent problems usually arise in a firm's innovation activities (Hang et al., 2018). Innovation is very important to maintain a company's competitive advantage, but it requires a lot of time and investment of resources that contributes to the decline in the company's short-term operational performance (Ali & Anwar, 2021). Managers will choose not to invest heavily in innovation activities and prefer steady performance improvements. Managers have an interest in increasing their wealth, so they have a tendency to reject innovation activities that require large financing. Innovation efficiency gives managers the opportunity to increase their wealth, because the enormous cost of innovation can be offset by a much greater increase in revenue (Grabowska &

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Saniuk, 2022; Zandi et al., 2019). This results in a company's short-term performance being maintained and having the hope of increasing when innovation efficiency is carried out. Shareholders' expectations that managers increase innovation activities can be realized if the efficiency of inno- vation can be fulfilled properly (Zandi et al., 2019). This shows that innovation efficiency is a strate- gy to bridge the interests of principals and agents when a company has the intention of increasing innovation activities.

Innovative companies are more flexible and more adaptable to the business environment, increasing opportunities better than competitors (Almulhim, 2020). Without continuous development and in- novation, it will disrupt a company's internal con- ditions and impact on the imbalance between sup- ply and demand in the market (Ruiter et al., 2022). This makes managers have no desire to carry out innovation projects to maintain the company's short-term performance growth. Innovation must consider efficiency factors in order to reduce the excessive burden on the use of company resources (Grabowska & Saniuk, 2022). Innovation efficien- cy plays an important role in an increasingly com- plex business environment where innovation effi- ciency can reduce unnecessary burdens to defend themselves in a competitive environment so that the innovations carried out do not have a significant impact on improving the company's performance (Kafetzopoulos et al., 2019).

Innovation comes from the company's desire to develop products that differ from competitors, create new products according to consumer preferences, and shorten the production cycle (Tavassoli & Karlsson, 2015). Products and processes result- ing from innovation activities create and develop market share, increasing sales volume. To achieve this, R&D is needed for customers, competitors, and company resources (Haryati et al., 2021). R&D causes a company's cash expenditure to in- crease, so efficiency is needed so as not to disrupt the company's cash flow. The efficiency of innova- tion optimally combines the use of innovation in- puts to produce greater output (Zandi et al., 2019). Innovation efficiency makes it easy for companies to expand their market share without placing an enormous burden on the company's operational activities, so that companies have the convenience of increasing sales volume, as well as improving performance (DC Chen & Chen, 2021). In addition, new products resulting from innovation activities make the company a market leader, so that it is easy to determine prices for these new products (De et al., 2020). This resulted in the company's revenue increasing from the addition of market share and the ability to shape prices. This shows that innovation efficiency is a strategy to improve company performance while remaining actively involved in the competitive environment (Qiao & Fung, 2016; Yan et al., 2019).

Companies with a concentrated ownership structure encourage managers to be more active in exploring forms of innovation that the company can develop (Mustafa et al., 2020). Concentrated ownership provides an injection of funding to finance investments in innovation to meet its expectations for future growth in the company's performance and increasing their prosperity (Gamariel et al., 2022). Large investment costs create the possibility for managers to get a smaller return from the performance they have done (Jensen, 2021). Agency problems that arise between principals and agents when innovating must be minimized as best as possible, so that companies can survive in a com- petitive environment and obtain better sustaina- bility in the future.

Active involvement of shareholders in the management process to influence managers' innovative efforts is a form of effort to resolve problems that arise among actors in innovation activities (Xie et al., 2019). Shareholders can use their ownership position to actively influence operations or man- agement when they are not satisfied with the im- plementation of the innovation strategy (Dilla et al., 2019). Shareholders help improve the risk-tak- ing process by managers, so managers are motivat- ed to increase the company's innovation activities (Eroglu & Sanders, 2021). Shareholders have the expectation that their profits will increase if they can influence the actions of managers to innovate (Xie et al., 2019). Companies with concentrated ownership will be more aggressive in increasing innovation due to the active involvement of share- holders in the management process. Shareholders seek to encourage managers to support their initi- atives to create innovations in business processes through efforts to increase innovation activities.

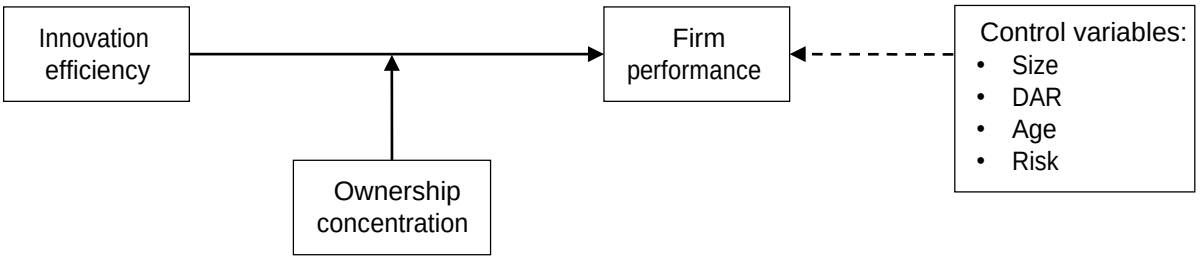

Figure 1. Conceptual framework

Companies with a concentrated ownership structure encourage management to increase the com- pany's innovation activities by considering cost ef- ficiency when innovation is carried out (Gamariel et al., 2022). Innovation efficiency increases when the company's ownership structure is more con- centrated due to the active involvement of share- holders in the management process (Yuan et al., 2020). Concentrated ownership roles to be actively involved in innovation activities provide tighter supervision to managers, so managers are more motivated to innovate and maintain cost efficien- cy (Yuan et al., 2020). The cost efficiency created during the innovation process has an impact on increasing market share, increasing sales volume, and minimizing operational costs (Exposito & Sanchis-Llopis, 2018). This makes it easy for com- pany managers to improve company performance (Muthuveloo et al., 2017). In addition, concentrated ownership encourages companymanagement to carry out innovation efficiency in order to minimize the current use of cash, so that cash disbursements can be maintained (Gamariel et al., 2022). This gives hope to managers to keep getting higher returns when innovation activity increas- es. Therefore, this study formulates the following hypotheses:

H1: Innovation efficiency has a positive effect on company performance.

H2: Concentrated ownership increases the effect of innovation efficiency on company performance.

Table 1. Definition and measurement of research variables

Source: Data tabulation, 2022.

No.	Variable	Indicators/measurements	Scale
1.	Firm performance, The measurement of a company's performance in question is only those that are directly related to innovation, which is difficult to determine (Wang & Wang, 2012)	$Roa = \frac{Net\ Income}{Total\ Assets}$	Ratio
2.	Innovation Efficiency, provides a basic explanation of how the use of resources as input for innovation provides optimal results (Qiao & Fung, 2016)	Innovation efficiency is obtained by operationalizing the input and output of innovation in the non-parametric mathematical method of Data Envelopment Analysis (DEA). To estimate the efficiency of innovation by using three inputs, namely: research and development expenses, engine repair expenses, and technology purchases and one output (Erkan et al., 2019). $hs = \frac{\sum_{i-1}^{m} Ui \cdot Yis}{\sum_{j=1}^{n} Vj \cdot Xjs}$	Ratio
3.	Ownership Concentration, has an important function in innovation projects (Belloc, 2012). Ownership concentration used in this study is concentrated ownership, because the dispersed ownership structure creates large differences in views between each owner so that it becomes an obstacle for companies to invest in innovation	Ownership concentration is calculated based on the hi- difference of the controlling shareholder (Shehadeh et al., 2022). This study uses the three largest controlling shareholders, so that ownership concentration is formulated: $OC = \left(Equity1 - Equity2 \right) 2 + \left(Equity2 - Equity3 \right) 2$	Ratio
4.	Firm Size (control), is used to estimate company size because companies with large assets have the opportunity to explore and exploit innovation activities. Therefore, companies with large assets have a high opportunity to increase innovation projects and make projects efficient (Cruz-Cázares et al., 2013)	Ln total assets (proxied by total assets)	Ratio

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Table 1 (cont.). Definition and measurement of research variables

No.	Variable	Indicators/measurements	Scale
5.	Capital structure (control), is used to measure capital structure because companies with large capital structures have the possibility to fund innovation activities (Lin, 2017)	$Debt\ to\ Equity = \frac{Total\ Liabilities}{Total\ Equity} \cdot 100\%$	Ratio
6.	Firm age (control), The age of a company indicates the maturity of the company in a competitive environment, where companies with a large age have more experience in business operations, making it easier to win the competition (Cruz-Cázares et al., 2013)	Calculated from the year of establishment to the present	Nominal
7.	Firm risk (control) shows the consequences of actions taken by company managers. Innovation is an activity that has a large risk, so the risk that the company currently has is a consideration for innovation efficiency in order to improve company performance	Company risk is calculated using the standard deviation of EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) divided by a company's total assets. The formula for the standard deviation of EBITDA is as follows: $CR = \sqrt{\frac{n\sum_{i-1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}{n(n-1)}}$ where *n* is the number of data and 1 is EBITDA. So, the formula for calculating company risk is: Risk = EBITDA Standard Deviation / Total Assets. A greater company risk indicates that the company's executives are risk taking, a smaller company risk indicates that the company's executives are risk averse	Ratio

2. METHOD

The study uses quantitative methods. The research data used in this study are secondary data. The population are manufacturing companies listed on the Indonesia Stock Exchange. A sample of 616 Indonesian manufacturing company data was used.

This study conducted data analysis and statistical testing using SPSS 24.0 to analyze descriptive statistics, correlation analysis, multiple linear regres- sion and moderated regression analysis. Multiple linear regression was used to test hypothesis 1, while moderated regression analysis was used to test hypothesis 2. The model developed to meas- ure the effect of innovation efficiency on company performance (hypothesis 1) is as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 SIZE + \beta_3 DER + \\ + \beta_4 AGE + \beta_5 RISK + \varepsilon,$$

while the model developed to measure ownership concentration moderation on the effect of innova- tion efficiency on company performance (hypoth- esis 2) is as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 OC + \beta_3 EFF \cdot OC + \varepsilon,$$

where *ROA*: Financial Performance; *EFF*: Innovation efficiency; *OC*: Ownership concentration; *SIZE*: Size firm; *DAR*: Capital structure; *AGE*: Firm age; and *RISK*: Firm risk.

3. RESULTS

Table 2 provides information on the number of companies that carry out product innovation efficiency during the period 2013 to 2019.

Table 2. Manufacturing companies that carry out product efficiency for the period 2013–2019

Source: Research data, 2019.

Year	Number of Companies	Number of Efficient Companies	%
2013	86	2	2.33
2014	90	2	2.22
2015	89	2	2.25
2016	81	2	2.47
2017	85	3	3.52
2018	94	3	3.19
2019	91	3	3.29

Table 2 shows that the efficiency of innovation is still minimal by manufacturing companies in Indonesia. This indicates that manufacturing companies in Indonesia have not been able to optimize the use of their resources for innovation activities.

Table 3. Descriptive statistics

Source: Research data, 2019.

Variable	N	Minimum	Maximum	mean	Std. Deviation
ROA	616	–0.401425	4.446758	0.044370	0.084450
EFF	616	0	1	0.044126	0.175878
OC	616	0.000000	0.992813	0.282687	0.2893058
DER	616	1,267	23.201	9.0281	11.2034
SIZE	616	10,392	24,918	22.9281	25,9291
AGE	616	5	7	3.4029	5,7261
RISK	616	–1.750198	2,64381	0.115318	0.547381
Valid N (listwise)					

Table 3 provides descriptive statistical results of the variables in this study. Here are the results of the test data.

From a sample of 616 manufacturing company data for the period 2013 to 2019, a company's per- formance shows a range of values of -0.401425 to 4.446758 with an average of 0.044370 and a stand- ard deviation of 0.084450. This shows that the sam- pled companies have different abilities in improv- ing their performance. Innovation efficiency shows that it has a value range of 0 to 1 with an average of 0,044126 and standard deviation 0,175878. These results indicate that there are still companies that have not been able to carry out innovation efficien- cy, and companies that have the ability to carry out innovation efficiency are still very low. Ownership concentration shows a range of values from 0 to 0,992813 with an average of 0,282687 and standard deviation of 0,2893058. These results indicate that in general manufacturing companies in Indonesia have a concentrated ownership structure, but there are companies that have scattered shareholdings. The average debt to equity ratio obtained is 9.0281 and the standard deviation is 11.2034. While the minimum value is 1,267 and the maximum is 23,201. This result means that manufacturing com- panies in Indonesia, which have a higher Debt to Equity Ratio value, have a higher amount of debt that must be paid off by the company within a cer- tain period of time. The firm risk value that has been tested produces a minimum value of -1.750198, and the maximum value is 2.64381. Meanwhile, the av- erage value is 0.115318 and the standard deviation value is 0.547381. This result means that the higher the risk of a company, which includes a high risk of uncertainty demand, the more it poses a risk. The company's income is uncertain, where, with the uncertainty of the company's income, this causes the company's profitability to decrease.

Table 4. Hypothesis testing

Source: Research data, 2019.

Variable	Model 1		Model 2	
	Coef	Sig	Coef	Sig
Constant	–1,247**	0.000	–1,212***	0.000
OC	0.277***	0.001	0.276***	0.001
EFF	0.124**	0.000	–0.021	0.861
ROA	0.213**	0.001	–0.005***	0.000
SIZE	0.482**	0.000	0.483***	0.000
DAR	0.046***	0.000	0.045***	0.000
AGE	0.910**	0.000	–0.032***	0.001
RISK	0.230**	0.001	–0.098***	0.000
EFF*OC	0.402**	0.000	–0.192***	0.000

Note: *** = positive and significant; ** = negative and significant

The results from Table 4 show that company size, age, and company risk have a positive and significant effect on company performance. In addition, the capital structure has a negative and significant effect on the company's performance. The first hypothesis states that there is a positive effect of innovation efficiency on company performance.

The results of the research on model 1 show that innovation efficiency has a positive and significant effect on company performance with a Beta (ß) value of 0.041 and p-value of 0.021. This result means that the higher the efficiency of innovation by the company, the higher its performance will be. Companies with a high level of efficiency when carrying out innovation projects have the advantage of improving their short-term performance (Peñarroya-Farell & Miralles, 2022).

The results of the research on model 2 show that the interaction of innovation efficiency with ownership concentration has a positive and significant effect on company performance. Based on the existing phenomenon, innovation efficiency makes it easy for companies to increase sales volume, in-

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crease sales growth, increase net profit, and min- imize investment costs for innovation (Qiao & Fung, 2016). This shows that innovation efficiency is a form of strategy that companies can develop to improve their performance (short or long term) and maintain their sustainability.

4. DISCUSSION

The findings of this study are in line with previous researchers who stated that innovation efficiency is a form of strategy to improve company performance by remaining actively involved in the competitive environment and there are several spaces that companies can develop to improve their in- novation efficiency (Trinugroho et al., 2022). The innovations made provide a better opportunity to become market leaders, so they are able to de- termine the price level for the new products they create (Chen et al., 2019). The amount of costs in- curred by a company to fund innovation projects can be minimized by managers when efficiency is carried out properly. Managers will choose the op- timal use of resources, so that the resulting inno- vation is in accordance with market needs.

The results of this study mean that the more concentrated shareholder ownership, this will encourage managers to be more active in making efficiency in innovation projects, so that it has an impact on increasing company performance. Concentrated ownership also encourages management to increase innovation projects to improve the company's position in the competitive environment. Concentrated ownership expects the company to be able to maintain a competitive advantage and increase the company's competitiveness with the company's innovations. The drive for concentrated ownership of managers is manifested by the direct involvement of shareholders in innovation projects. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct involvement of concentrated ownership makes innovation projects more efficient in their financing. Concentrated owner- ship expects that innovation projects run by man- agers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financ- ing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innova- tion projects. The direct involvement of concen- trated ownership makes innovation projects more efficient in their financing.

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CONCLUSION

This study finds that manufacturing companies in Indonesia are still lacking in innovation efficiency, so they have vulnerabilities in facing global competition. Indonesia has a goal to become one of the developed countries in the world economy. Therefore, it is important for every company in Indonesia to continuously develop innovations in their products or production processes to support these goals. Innovation is a strategy for every company in Indonesia to be able to compete with the global compet-

itive environment. Therefore, when developing an innovative strategy, it is necessary to consider efficiency in the project financing process. Innovation efficiency provides an opportunity for each company to develop its business processes without placing great pressure on company resources (Grabowska & Saniuk, 2022). In Indonesia, the corporate ownership structure is dominated by concentrated ownership. This condition makes it easier for each company to carry out innovation projects and make efficiencies due to the strong encouragement of the company owners. Concentrated ownership can encourage managers to improve the company's innovation projects to maintain performance growth, maintain competitive advantage, and maintain company viability (Shehadeh et al., 2022).

The limitation of this study is that this finding has not technically explained the steps that need to be taken by entrepreneurs to carry out the efficiency of product innovation they produce. Thus, this limitation can be covered by the existence of further research in the future that will examine the strategic steps that need to be taken by entrepreneurs to carry out product innovation efficiency, so that their business performance can continue to develop and be competitive and have a competitive advantage in the future. This finding provides a signal for several stakeholders to start controlling the innovation work carried out by a company's management, the aim is to form budget efficiency and the effectiveness of innovation products in the future.

AUTHOR CONTRIBUTIONS

Conceptualization: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati
Data curation: Triyonowati, Suwitho, Titik Mildawati
Formal analysis: Triyonowati, Suwitho, Titik Mildawati
Funding acquisition: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati
Investigation: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati
Methodology: Triyonowati, Suwitho, Titik Mildawati
Project administration: Triyonowati, Suwitho, Titik Mildawati
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Visualization: Triyonowati, Rizki Amalia Elfita, Suwitho, TitikMildawati
Writing – original draft: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati
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“Does innovation efficiency affect financial performance? The role of ownership concentration”

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Does innovation efficiency affect financial performance? The role of ownership concentration

Abstract

The company that is synonymous with the application of science and technology is the manufacturing industry (Krmela et al., 2022). Manufacturing companies in Indonesia have been accustomed to the use of technology in their production activities so far, be- cause technology really helps the company's production to be more effective (Muchran, 2020). This study examines the effect of innovation efficiency on firm performance and the moderating role of ownership concentration on this effect. This study examines innovation efficiency as the optimal combination of innovation input and innovation output. The inputs used are research and development expenses, machine repair ex- penses, and information technology purchases. Meanwhile, the output of innovation. This study used 616 annual reports of manufacturing companies from 2013 to 2018. The analytical technique used is a moderated regression analysis. The results show that efficiency is positively and significantly correlated with company performance. In ad- dition, the results of the study provide evidence of concentrated ownership, encour- aging managers to be more intensive in carrying out innovation efficiency so that it affects increasing company performance. These findings show that there is efficiency in innovation projects that can improve company performance, and companies with concentrated ownership find it easier to carry out innovation efficiency because of the active involvement of shareholders in the management process when innovation proj- ects are implemented aimed at improving company performance.

Keywords industry management, firm strategy, market performance, corporate financial management, sustainable development financing

JEL Classification F63, L16, M11, M21, O11

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INTRODUCTION

Changes in the manufacturing environment today are becoming more dynamic and, in the future, will force all manufacturing companies to use technology to support their manufacturing activities. (Yeung, 2021). Innovation provides space for companies to seize new oppor- tunities and improve company competitiveness (Lestari et al., 2020). Companies that fail to innovate affect the rejection of the company's products, the reduction of the production cycle and the loss of the company's position in the market environment (Jensen, 2021).

Innovation drives companies to discover and create new ideas, take risks, and encourage new business approaches (Sanchez-Henriquez & Pavez, 2021). Companies are also required to produce quality products or services at low costs, improvise products with new attributes and produce products that differ from the previous ones from the inno- vation activities carried out (Jensen, 2021). Therefore, innovation is an important effort that must be carried out by every company in the modern era in order to win the competition, maintain

sustainabili-

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ty, and improve company performance. Innovation efficiency reduces unnecessary burdens to defend themselves in a competitive environment, so that the innovations carried out do not have a significant impact on the decline in company performance (Grabowska & Saniuk, 2022). Management's ability to properly calculate the efficiency of innovation can provide benefits to efforts to meet consumer prefer- ences without placing an excessive burden on company resources (Adomah Worae & Ngwakwe, 2017). Innovation efficiency is defined as a company's ability to translate innovation inputs into innovation outputs (Türkeş et al., 2021). Although innovation is not a linear process of changing innovation inputs into innovation outputs, the study how the resources used as innovation inputs provide optimal output explains the concept of innovation efficiency (Türkeş et al., 2021).

Good corporate governance can design innovation effectively, so that efficiency can be built properly in the innovation process (Yin & Sheng, 2019). Ownership is the foundation of corporate governance because a company cannot exist without owners, and share ownership rights are allocated to owners (Aguilera & Crespi-Cladera, 2016). Ownership contributes to value creation, builds a long-term com- pany vision, and takes a part in allocating company resources (Ma et al., 2022). Regarding innovation, ownership structure encourages management to increase innovation activities, especially concentrated ownership structure (Shehadeh et al., 2022). Innovation investments that involve high costs and high risks are a hard choice for companies with dispersed ownership structures (Khan et al., 2021). The dis- persed ownership structure creates enormous differences in views between each owner so that it be- comes an obstacle for companies to invest in innovation (Ma et al., 2022). In addition, companies with a concentrated ownership structure more easily absorb organizational culture that leads to innovation activities (Shehadeh et al., 2022).

Concentrated ownership encourages managers to increase innovation activities for the growth and sus- tainability of a company in the future (Ma et al., 2022). Innovation can be well received by managers if efficiency can be carried out in innovation activities (Jensen, 2021). Managers do not miss the oppor- tunity to maximize non-corporate value that benefits their position and interests. The effectiveness of resource allocation when innovation efficiency is carried out results in lower innovation input costs than the resulting output. Innovation is aimed at improving a company's performance in the long term (Yin & Sheng, 2019). A company's performance improvement is carried out by seeking a better market position through product and process innovation (Kurniawati et al., 2022). New products and services resulting from the innovation process generate new market share, the ability to create prices, to encour- age increased company profitability (Tarigan et al., 2019).

There is a lack of models to track the effect of various types of innovations on firm performance over time, so future research is recommended to validate the findings of previous studies and present an integrative research framework that simultaneously covers the influence of innovation and firm per- formance (Agostini et al., 2017). This study looks at this opportunity and examines the efficiency of in- novation as an integrative framework for innovation. Efficiency is an important concept in innovation, because investing in innovation is not an activity that company management wants (Türkeş et al., 2021).

1. LITERATURE REVIEW

Principal-agent problems usually arise in a firm's innovation activities (Hang et al., 2018). Innovation is very important to maintain a com- pany's competitive advantage, but it requires a lot of time and investment of resources that contrib- utes to the decline in the company's short-term operational performance (Ali & Anwar, 2021).

Managers will choose not to invest heavily in in- novation activities and prefer steady performance improvements. Managers have an interest in in- creasing their wealth, so they have a tendency to reject innovation activities that require large financing. Innovation efficiency gives managers the opportunity to increase their wealth, because the enormous cost of innovation can be offset by a much greater increase in revenue (Grabowska &

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Saniuk, 2022; Zandi et al., 2019). This results in a company's short-term performance being main- tained and having the hope of increasing when innovation efficiency is carried out. Shareholders' expectations that managers increase innovation activities can be realized if the efficiency of inno- vation can be fulfilled properly (Zandi et al., 2019). This shows that innovation efficiency is a strate- gy to bridge the interests of principals and agents when a company has the intention of increasing innovation activities.

Innovative companies are more flexible and more adaptable to the business environment, increasing opportunities better than competitors (Almulhim, 2020). Without continuous development and in- novation, it will disrupt a company's internal con- ditions and impact on the imbalance between sup- ply and demand in the market (Ruiter et al., 2022). This makes managers have no desire to carry out innovation projects to maintain the company's short-term performance growth. Innovation must consider efficiency factors in order to reduce the excessive burden on the use of company resources (Grabowska & Saniuk, 2022). Innovation efficien- cy plays an important role in an increasingly com- plex business environment where innovation effi- ciency can reduce unnecessary burdens to defend themselves in a competitive environment so that the innovations carried out do not have a signifi- cant impact on improving the company's perfor- mance (Kafetzopouloset al., 2019).

Innovation comes from the company's desire to develop products that differ from competitors, cre- ate new products according to consumer prefer- ences, and shorten the production cycle (Tavassoli & Karlsson, 2015). Products and processes result- ing from innovation activities create and develop market share, increasing sales volume. To achieve this, R&D is needed for customers, competitors, and company resources (Haryati et al., 2021). R&D causes a company's cash expenditure to in- crease, so efficiency is needed so as not to disrupt the company's cash flow. The efficiency of innova- tion optimally combines the use of innovation in- puts to produce greater output (Zandi et al., 2019). Innovation efficiency makes it easy for companies to expand their market share without placing an enormous burden on the company's operational activities, so that companies have the convenience

of increasing sales volume, as well as improving performance (DC Chen & Chen, 2021). In addi- tion, new products resulting from innovation activities make the company a market leader, so that it is easy to determine prices for these new prod- ucts (De et al., 2020). This resulted in the company's revenue increasing from the addition of market share and the ability to shape prices. This shows that innovation efficiency is a strategy to improve company performance while remaining actively involved in the competitive environment (Qiao & Fung, 2016; Yan et al., 2019).

Companies with a concentrated ownership struc- ture encourage managers to be more active in exploring forms of innovation that the company can develop (Mustafa et al., 2020). Concentrated own- ership provides an injection of funding to finance investments in innovation to meet its expectations for future growth in the company's performance and increasing their prosperity (Gamariel et al., 2022). Large investment costs create the possibility for managers to get a smaller return from the performance they have done (Jensen, 2021). Agency problems that arise between principals and agents when innovating must be minimized as best as possible, so that companies can survive in a com- petitive environment and obtain better sustaina- bility in the future.

Active involvement of shareholders in the manage- ment process to influence managers' innovative ef- forts is a form of effort to resolve problems that arise among actors in innovation activities (Xie et al., 2019). Shareholders can use their ownership position to actively influence operations or man- agement when they are not satisfied with the im- plementation of the innovation strategy (Dilla et al., 2019). Shareholders help improve the risk-tak- ing process by managers, so managers are motivat- ed to increase the company's innovation activities (Eroglu & Sanders, 2021). Shareholders have the expectation that their profits will increase if they can influence the actions of managers to innovate (Xie et al., 2019). Companies with concentrated ownership will be more aggressive in increasing innovation due to the active involvement of share- holders in the management process. Shareholders seek to encourage managers to support their initi- atives to create innovations in business processes through efforts to increase innovation activities.

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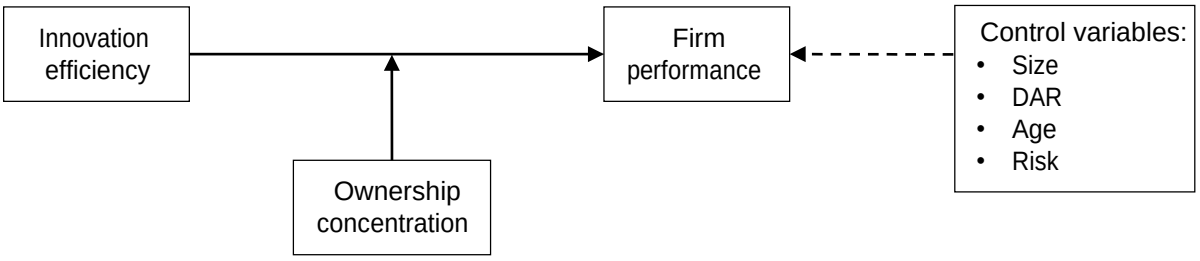

Figure 1. Conceptual framework

Companies with a concentrated ownership struc- ture encourage management to increase the com- pany's innovation activities by considering cost ef- ficiency when innovation is carried out (Gamariel et al., 2022). Innovation efficiency increases when the company's ownership structure is more con- centrated due to the active involvement of share- holders in the management process (Yuan et al., 2020). Concentrated ownership roles to be actively involved in innovation activities provide tighter supervision to managers, so managers are more motivated to innovate and maintain cost efficien- cy (Yuan et al., 2020). The cost efficiency created during the innovation process has an impact on increasing market share, increasing sales volume, and minimizing operational costs (Exposito & Sanchis-Llopis, 2018). This makes it easy for com- pany managers to improve company performance (Muthuveloo et al., 2017). In addition, concen- trated ownership encourages company manage- ment to carry out innovation efficiency in order to minimize the current use of cash, so that cash disbursements can be maintained (Gamariel et al., 2022). This gives hope to managers to keep getting higher returns when innovation activity increas- es. Therefore, this study formulates the following hypotheses:

H1: Innovation efficiency has a positive effect on company performance.

H2: Concentrated ownership increases the effect of innovation efficiency on company performance.

Table 1. Definition and measurement of research variables

Source: Data tabulation, 2022.

No.	Variable	Indicators/measurements	Scale
1.	Firm performance, The measurement of a company's performance in question is only those that are directly related to innovation, which is difficult to determine (Wang & Wang, 2012)	$Roa = \frac{Net\ Income}{Total\ Assets}$	Ratio
2.	Innovation Efficiency, provides a basic explanation of how the use of resources as input for innovation provides optimal results (Qiao & Fung, 2016)	Innovation efficiency is obtained by operationalizing the input and output of innovation in the non-parametric mathematical method of Data Envelopment Analysis (DEA). To estimate the efficiency of innovation by using three inputs, namely: research and development expenses, engine repair expenses, and technology purchases and one output (Erkan et al., 2019). $hs = \frac{\sum_{i-1}^{m} Ui \cdot Yis}{\sum_{j=1}^{n} Vj \cdot Xjs}$	Ratio
3.	Ownership Concentration, has an important function in innovation projects (Belloc, 2012). Ownership concentration used in this study is concentrated ownership, because the dispersed ownership structure creates large differences in views between each owner so that it becomes an obstacle for companies to invest in innovation	Ownership concentration is calculated based on the hi- difference of the controlling shareholder (Shehadeh et al., 2022). This study uses the three largest controlling shareholders, so that ownership concentration is formulated: $OC = (Equity1 - Equity2)\ 2 + (Equity2 - Equity3)\ 2$	Ratio
4.	Firm Size (control), is used to estimate company size because companies with large assets have the opportunity to explore and exploit innovation activities. Therefore, companies with large assets have a high opportunity to increase innovation projects and make projects efficient (Cruz-Cázares et al., 2013)	Ln total assets (proxied by total assets)	Ratio

Table 1 (cont.). Definition and measurement of research variables

No.	Variable	Indicators/measurements	Scale
5.	Capital structure (control), is used to measure capital structure because companies with large capital structures have the possibility to fund innovation activities (Lin, 2017)	$Debt\ to\ Equity = \frac{Total\ Liabilities}{Total\ Equity} \cdot 100\%$	Ratio
6.	Firm age (control), The age of a company indicates the maturity of the company in a competitive environment, where companies with a large age have more experience in business operations, making it easier to win the competition (Cruz-Cázares et al., 2013)	Calculated from the year of establishment to the present	Nominal
7.	Firm risk (control) shows the consequences of actions taken by company managers. Innovation is an activity that has a large risk, so the risk that the company currently has is a consideration for innovation efficiency in order to improve company performance	Company risk is calculated using the standard deviation of EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) divided by a company's total assets. The formula for the standard deviation of EBITDA is as follows: $CR = \sqrt{\frac{n\sum_{i-1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}{n(n-1)}}$ where *n* is the number of data and 1 is EBITDA. So, the formula for calculating company risk is: Risk = EBITDA Standard Deviation / Total Assets. A greater company risk indicates that the company's executives are risk taking, a smaller company risk indicates that the company's executives are risk averse	Ratio

2. METHOD

The study uses quantitative methods. The research data used in this study are secondary data. The population are manufacturing companies listed on the Indonesia Stock Exchange. A sample of 616 Indonesian manufacturing company data was used.

This study conducted data analysis and statistical testing using SPSS 24.0 to analyze descriptive sta- tistics, correlation analysis, multiple linear regres- sion and moderated regression analysis. Multiple linear regression was used to test hypothesis 1, while moderated regression analysis was used to test hypothesis 2. The model developed to meas- ure the effect of innovation efficiency on company performance (hypothesis 1) is as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 SIZE + \beta_3 DER + \\ + \beta_4 AGE + \beta_5 RISK + \varepsilon,$$

while the model developed to measure ownership concentration moderation on the effect of innova- tion efficiency on company performance (hypoth- esis 2) is as follows:

$$ROA = \alpha + \beta_1 EFF + \beta_2 OC + \beta_3 EFF \cdot OC + \varepsilon,$$

where *ROA*: Financial Performance; *EFF*: Inno- vation efficiency; *OC*: Ownership concentration; *SIZE*: Size firm; *DAR*: Capital structure; *AGE*: Firm age; and *RISK*: Firm risk.

3. RESULTS

Table 2 provides information on the number of companies that carry out product innovation effi- ciency during the period 2013 to 2019.

Table 2. Manufacturing companies that carry out product efficiency for the period 2013–2019

Source: Research data, 2019.

Year	Number of Companies	Number of Efficient Companies	%
2013	86	2	2.33
2014	90	2	2.22
2015	89	2	2.25
2016	81	2	2.47
2017	85	3	3.52
2018	94	3	3.19
2019	91	3	3.29

Table 2 shows that the efficiency of innovation is still minimal by manufacturing companies in Indonesia. This indicates that manufacturing companies in Indonesia have not been able to op- timize the use of their resources for innovation activities.

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Table 3. Descriptive statistics

Source: Research data, 2019.

Variable	N	Minimum	Maximum	mean	Std. Deviation
ROA	616	–0.401425	4.446758	0.044370	0.084450
EFF	616	0	1	0.044126	0.175878
OC	616	0.000000	0.992813	0.282687	0.2893058
DER	616	1,267	23.201	9.0281	11.2034
SIZE	616	10,392	24,918	22.9281	25,9291
AGE	616	5	7	3.4029	5,7261
RISK	616	–1.750198	2,64381	0.115318	0.547381
Valid N (listwise)					

Table 3 provides descriptive statistical results of the variables in this study. Here are the results of the test data.

From a sample of 616 manufacturing company data for the period 2013 to 2019, a company's per- formance shows a range of values of -0.401425 to 4.446758 with an average of 0.044370 and a stand- ard deviation of 0.084450. This shows that the sam- pled companies have different abilities in improv- ing their performance. Innovation efficiency shows that it has a value range of 0 to 1 with an average of 0,044126 and standard deviation 0,175878. These results indicate that there are still companies that have not been able to carry out innovation efficien- cy, and companies that have the ability to carry out innovation efficiency are still very low. Ownership concentration shows a range of values from 0 to 0,992813 with an average of 0,282687 and standard deviation of 0,2893058. These results indicate that in general manufacturing companies in Indonesia have a concentrated ownership structure, but there are companies that have scattered shareholdings. The average debt to equity ratio obtained is 9.0281 and the standard deviation is 11.2034. While the minimum value is 1,267 and the maximum is 23,201. This result means that manufacturing com- panies in Indonesia, which have a higher Debt to Equity Ratio value, have a higher amount of debt that must be paid off by the company within a cer- tain period of time. The firm risk value that has been tested produces a minimum value of -1.750198, and the maximum value is 2.64381. Meanwhile, the av- erage value is 0.115318 and the standard deviation value is 0.547381. This result means that the higher the risk of a company, which includes a high risk of uncertainty demand, the more it poses a risk. The company's income is uncertain,

Table 4. Hypothesis testing

Source: Research data, 2019.

Variable	Model 1		Model 2	
	Coef	Sig	Coef	Sig
Constant	–1,247**	0.000	–1,212***	0.000
OC	0.277***	0.001	0.276***	0.001
EFF	0.124**	0.000	–0.021	0.861
ROA	0.213**	0.001	–0.005***	0.000
SIZE	0.482**	0.000	0.483***	0.000
DAR	0.046***	0.000	0.045***	0.000
AGE	0.910**	0.000	–0.032***	0.001
RISK	0.230**	0.001	–0.098***	0.000
EFF*OC	0.402**	0.000	–0.192***	0.000

where, with the uncertainty of the company's income, this causes the company's profitability to decrease.

Note: *** = positive and significant; ** = negative and significant.

The results from Table 4 show that company size, age, and company risk have a positive and signifi- cant effect on company performance. In addition, the capital structure has a negative and significant effect on the company's performance. The first hy- pothesis states that there is a positive effect of in- novation efficiency on company performance.

The results of the research on model 1 show that innovation efficiency has a positive and signifi- cant effect on company performance with a Beta (ß) value of 0.041 and p-value of 0.021. This result means that the higher the efficiency of innovation by the company, the higher its performance will be. Companies with a high level of efficiency when carrying out innovation projects have the advan- tage of improving their short-term performance (Peñarroya-Farell & Miralles, 2022).

The results of the research on model 2 show that the interaction of innovation efficiency with own- ership concentration has a positive and significant effect on company performance. Based on the ex- isting phenomenon, innovation efficiency makes it easy for companies to increase sales volume, in-

crease sales growth, increase net profit, and min- imize investment costs for innovation (Qiao & Fung, 2016). This shows that innovation efficiency is a form of strategy that companies can develop to improve their performance (short or long term) and maintain their sustainability.

4. DISCUSSION

The findings of this study are in line with previous researchers who stated that innovation efficiency is a form of strategy to improve company perfor- mance by remaining actively involved in the com- petitive environment and there are several spaces that companies can develop to improve their in- novation efficiency (Trinugroho et al., 2022). The innovations made provide a better opportunity to become market leaders, so they are able to de- termine the price level for the new products they create (Chen et al., 2019). The amount of costs in- curred by a company to fund innovation projects can be minimized by managers when efficiency is carried out properly. Managers will choose the op- timal use of resources, so that the resulting inno- vation is in accordance with market needs.

The results of this study mean that the more con- centrated shareholder ownership, this will en- courage managers to be more active in making efficiency in innovation projects, so that it has an impact on increasing company performance. Concentrated ownership also encourages man- agement to increase innovation projects to im- prove the company's position in the competitive environment. Concentrated ownership expects the company to be able to maintain a competi- tive advantage and increase the company's com- petitiveness with the company's innovations. The drive for concentrated ownership of managers is manifested by the direct involvement of share- holders in innovation projects. Concentrated ownership will monitor and supervise managers regarding the success of the company's innova- tion projects. The direct involvement of concen- trated ownership makes innovation projects more efficient in their financing. Concentrated owner- ship expects that innovation projects run by man- agers do not require large injections of funding, so they do not burden the owners. Companies with concentrated ownership will be more active to innovate and make efficiency in project financ- ing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innova- tion projects. The direct involvement of concen- trated ownership makes innovation projects more efficient in their financing.

Concentrated ownership expects that innovation projects run by managers do not require large injections of funding, so they do not burden the owners. Companies with concentrated owner- ship will be more active to innovate and make ef- ficiency in project financing, so that companies are able to improve their performance from the efficiency of innovations carried out by company managers. Concentrated ownership will monitor and supervise managers regarding the success of the company's innovation projects. The direct in- volvement of concentrated ownership makes in- novation projects more efficient in their financing (Shehadeh et al., 2022). The direct involvement of concentrated ownership in innovation projects provides opportunities for companies to main- tain competitive advantage and improve compa- ny performance. The findings of this study are in line with previous findings, which state that concentrated ownership plays an important role in innovation projects, so that it makes it easi- er for companies to improve their performance (Chatterjee & Bhattacharjee, 2020).

CONCLUSION

This study finds that manufacturing companies in Indonesia are still lacking in innovation efficiency, so they have vulnerabilities in facing global competition. Indonesia has a goal to become one of the developed countries in the world economy. Therefore, it is important for

every company in Indonesia to continuously develop innovations in their products or production processes to support these goals. Innovation is a strategy for every company in Indonesia to be able to compete with the global compet-

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itive environment. Therefore, when developing an innovative strategy, it is necessary to consider effi- ciency in the project financing process. Innovation efficiency provides an opportunity for each company to develop its business processes without placing great pressure on company resources (Grabowska & Saniuk, 2022). In Indonesia, the corporate ownership structure is dominated by concentrated owner- ship. This condition makes it easier for each company to carry out innovation projects and make effi- ciencies due to the strong encouragement of the company owners. Concentrated ownership can encour- age managers to improve the company's innovation projects to maintain performance growth, maintain competitive advantage, and maintain company viability (Shehadeh et al., 2022).

The limitation of this study is that this finding has not technically explained the steps that need to be taken by entrepreneurs to carry out the efficiency of product innovation they produce. Thus, this lim- itation can be covered by the existence of further research in the future that will examine the strategic steps that need to be taken by entrepreneurs to carry out product innovation efficiency, so that their business performance can continue to develop and be competitive and have a competitive advantage in the future. This finding provides a signal for several stakeholders to start controlling the innovation work carried out by a company's management, the aim is to form budget efficiency and the effectiveness of innovation products in the future.

AUTHOR CONTRIBUTIONS

Conceptualization: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati. Data curation: Triyonowati, Suwitho, Titik Mildawati.
Formal analysis: Triyonowati, Suwitho, Titik Mildawati.
Funding acquisition: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati.
Investigation: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati.
Methodology: Triyonowati, Suwitho, Titik Mildawati.
Project administration: Triyonowati, Suwitho, Titik Mildawati. Resources: Triyonowati, Suwitho, Titik Mildawati.
Software: Triyonowati, Suwitho, Titik Mildawati. Supervision: Triyonowati, Suwitho, Titik Mildawati.
Validation: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati.
Visualization: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati.
Writing – original draft: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati. Writing – review & editing: Triyonowati, Rizki Amalia Elfita, Suwitho, Titik Mildawati.

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